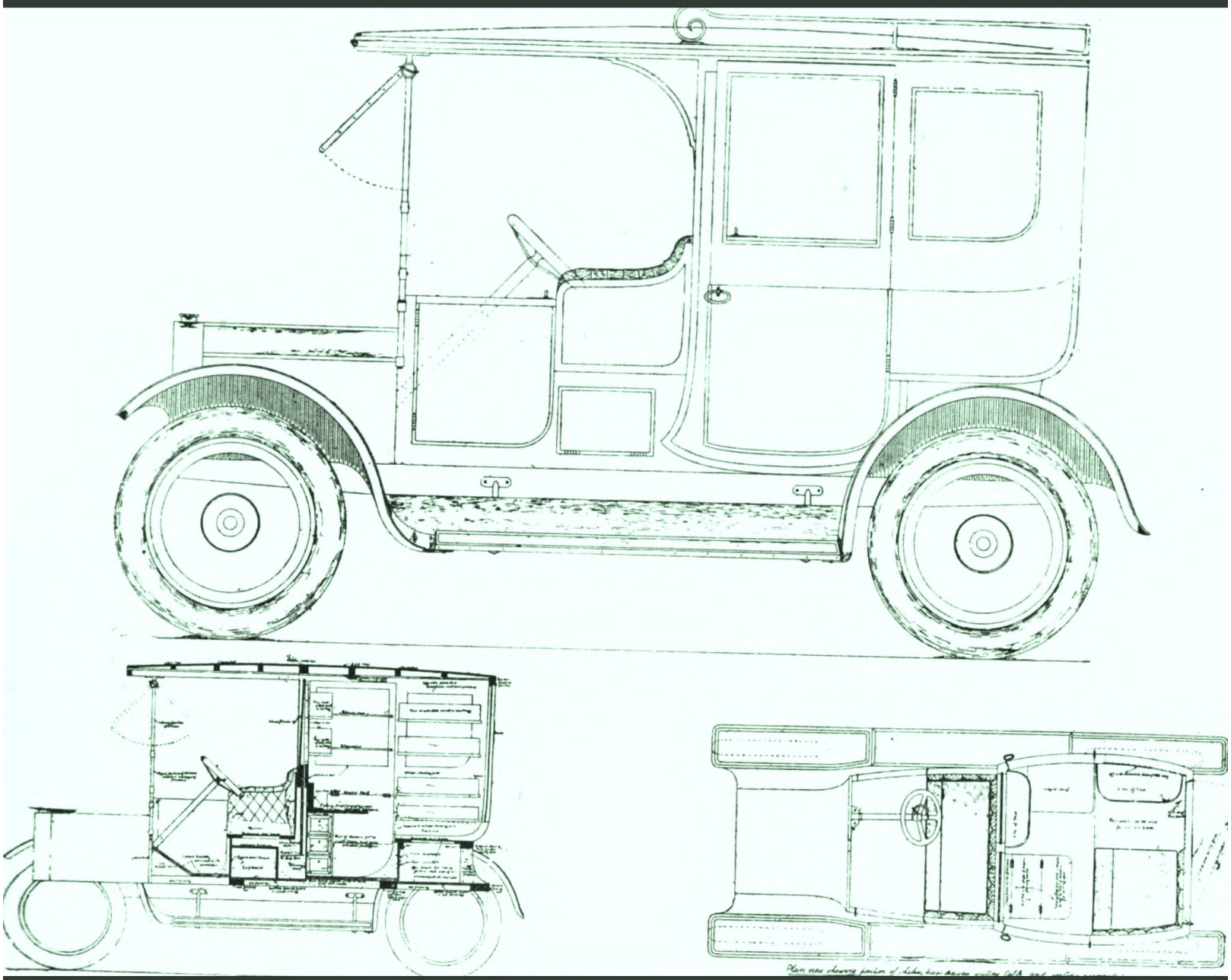
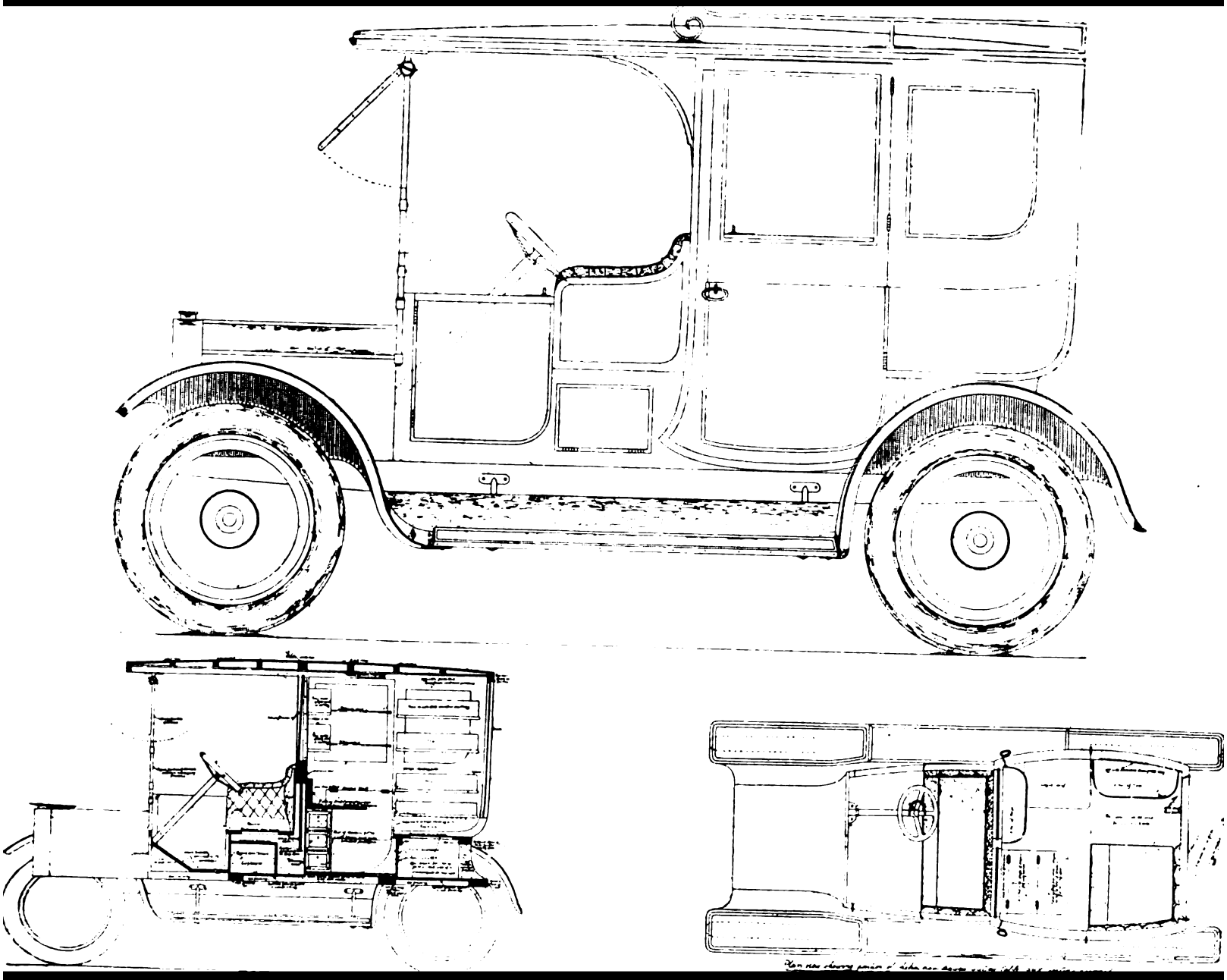
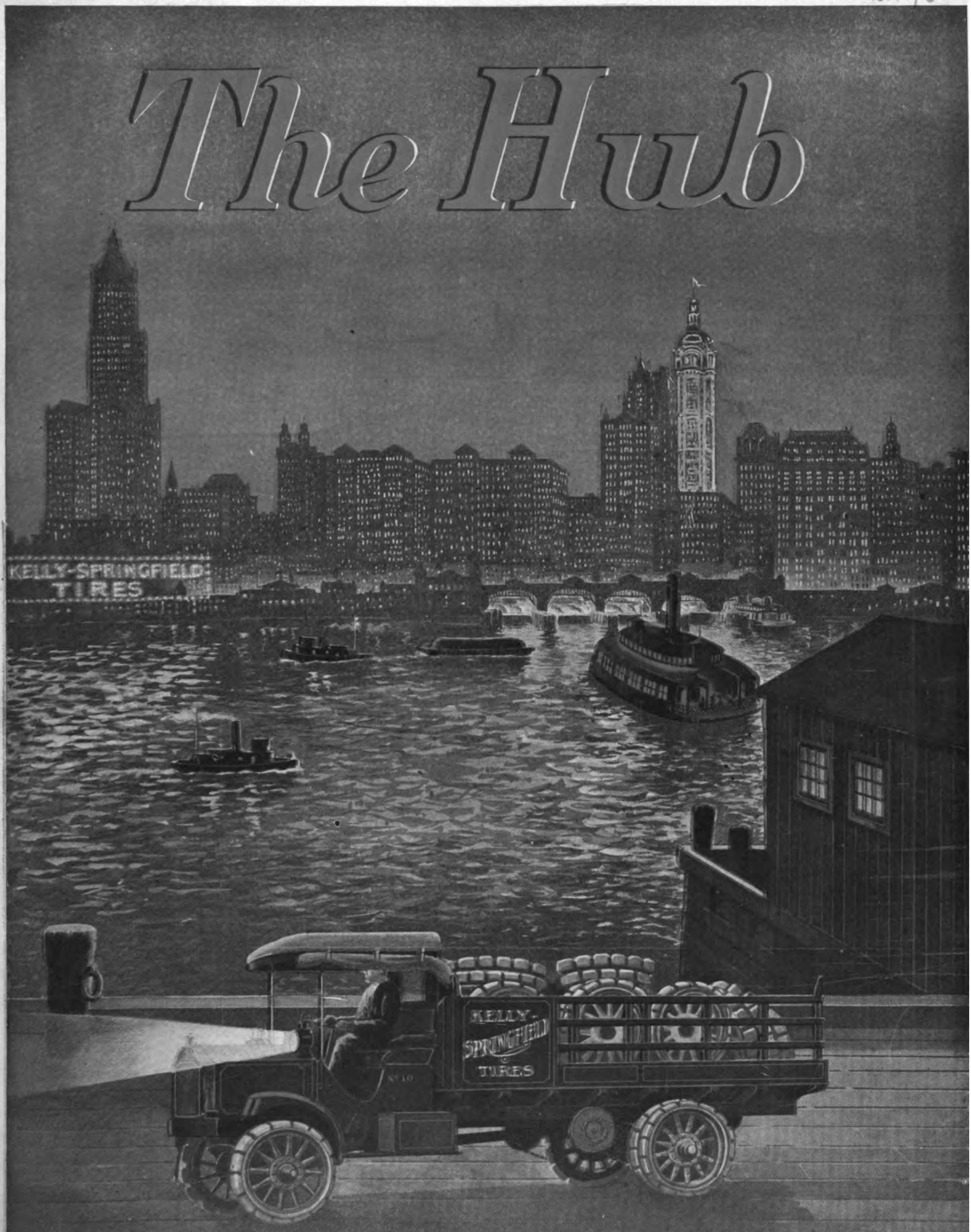


The automotive manufacturer



The automotive manufacturer

The Hub



TRADE NEWS PUBLISHING COMPANY
24-26 MURRAY ST., NEW YORK

LOZIER

The Pierce-Arrow

FIAT

Packard

Stearns
THE ULTIMATE CAR

KisselKar

Studebaker

All These Cars Are Painted With Valentine's Materials

Not only those named here but the majority of the best automobile manufacturers in the country are using "Valentine's."

If the manufacturer used "Valentine's painting materials to finish his car originally, doesn't it stand to reason that "Valentine's are the best for **refinishing** it.

For hoods, fenders and underparts, "Vanadium Chassis" is the only finish not affected by soapy water, oil and mud. It retains its lustre—that's what counts with owners.

Write for booklets on "Automobile Painting Systems" and "The Care of the Car."

Valentine & Company

456 Fourth Avenue, New York

343 S. Dearborn Street, Chicago — 74 Pearl Street, Boston

Trade VALENTINES VARNISH Mark

Peerless

Baker Electric

COLE

ALCO

Garford MOTOR C

GENERAL VEHICLE GREATEST VALUE

National

Velie

WINTON SIX

Cadillac

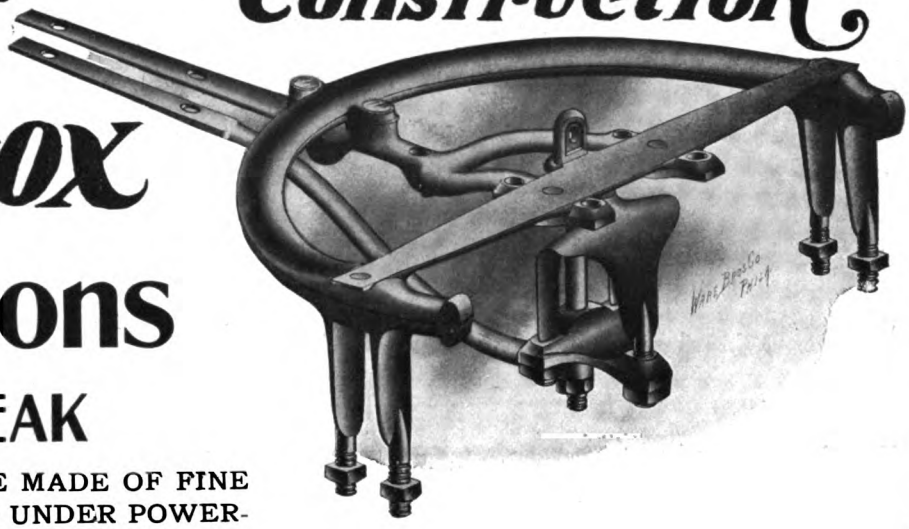
Stoddard-Dayton

MARMON

Chalmers
MOTOR CARS

STRENGTH

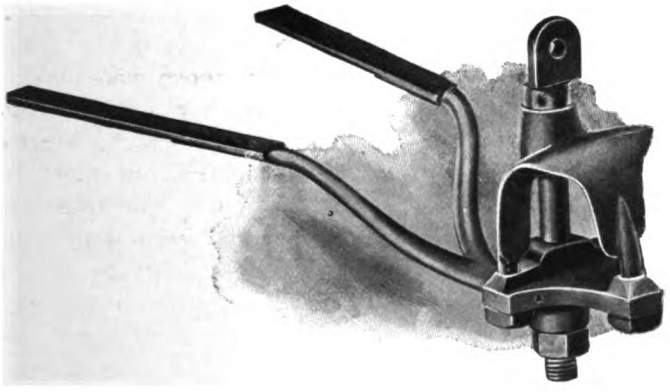
IN Gear Iron Construction



Wilcox Gear Irons

NEVER BREAK

THIS IS BECAUSE THEY'RE MADE OF FINE STEEL AND DROP FORGED UNDER POWERFUL STEAM HAMMERS



This Three Prong Rear King Bolt

MAKES STRONGER CONSTRUCTION POSSIBLE, BECAUSE THE AXLE DOES NOT REQUIRE BORING. THE KING BOLT PASSES BEHIND AXLE THROUGH A YOKE, AND IS DOUBLE LOCKED IN HEAD-BLOCK AND YOKE. THIS COMBINATION POSITIVELY PREVENTS RATTLING

WILCOX GEARS ARE MONEY SAVERS FROM A CONSTRUCTION STANDPOINT. EXPERT MECHANICS ARE NO LONGER REQUIRED IN YOUR ASSEMBLING ROOM. A BOY CAN PUT A WILCOX GEAR TOGETHER AS READILY AS A MAN, BECAUSE IT IS DRILLED IN EVERY PART BEFORE BEING SHIPPED. WE MAKE GEAR SETS IN SINGLE AND DOUBLE PERCH, FULL DESCRIPTIONS OF WHICH ARE CONTAINED IN OUR ILLUSTRATED No. 11D CATALOGUE. WRITE FOR A COPY TODAY

The D. Wilcox Mfg. Co.

Mechanicsburg, Pa.

The Hub

Entered in the New York Post Office as Second-class Matter

Vol. LV APRIL, 1913 No. 1

THE TRADE NEWS PUBLISHING CO. OF N. Y.
Publishers of THE HUB

J. H. WRIGHT, *President.* G. A. TANNER, *Secretary and Treasurer.*
24-26 MURRAY STREET, NEW YORK.

Other Publications of Trade News Publishing Co.:
HARNESS (monthly).....per year, $1.00
AMERICAN HARNESS AND SADDLERY DIRECTORY (annual).....per copy, $4.00

THE HUB is published monthly in the interest of employers and workmen connected with the manufacture of Carriages, Wagons, Sleighs, Automobiles and the Accessory trades, and also in the interest of Dealers.

Subscription price for the United States, Mexico, Cuba, Porto Rico, Guam, the Philippines, and the Hawaiian Islands, $2.00, Canada, $2.50, *payable strictly in advance.* Single copies, 25 cents. Remittances at risk of subscriber, unless by registered letter, or by draft, check, express or post-office order, payable to the order of TRADE NEWS PUBLISHING CO.

For advertising rates, apply to the Publishers. Advertisements must be acceptable in every respect. Copy for new advertisements must be received by the 25th of the preceding month, and requests to alter or discontinue advertisements must be received before the 12th day of the preceding month to insure attention in the following number. All communications must be accompanied by the full name and address of writer.

FOREIGN REPRESENTATIVES:

FRANCE.—L. Dupont, publisher of *Le Guide due Carrossier,* 78 Rue Boissiere, Paris. Subscription price, 15 francs, postpaid.

GERMANY.—Gustave Miesen, Bohn a Rh. Subscription price, 12 marks, postpaid.

ENGLAND.—Thomas Mattison, "Floriana," Hillside Avenue, Bitterne Park, Southampton. Subscription price, 12 shillings, postpaid.

Entered in the New York Post Office as Second-class Matter.

Names of Things

A Mr. Holmes in England has been given the job, or has assumed it, of standardizing the names of automobiles. Good idea.

We hope Mr. Holmes will do a work that will not be picked to bits by the various cooks that have cooked the present name-broth that afflicts us. It is pretty much of a guess how to name a limousine or a landau, or the same thing with an "et" or "ette" sticker pasted on the end of the name, because there seems to be no general agreement.

When a vehicle body is modified there comes some distinguishing hyphenated name to tell what it means, but the next builder that comes along changes that again, until it is quite confusing.

Mr. Holmes' work will be valuable if he can make it generally acceptable. As our powers of imitation are equal to any demand made upon them, we will gladly copy the new names as soon as we are accustomed to them.

The auto car has been such a fast developing affair that its state has been one of transition all the time, and there is no trade custom attaching to it as yet. "Car" seems to be a term that has stuck rather more steadfastly than any other word, probably because the clumsy "automobile" was too much of a mouthful for trade or business purposes. "Wings" as a replacement for mud-guards seems to have become somewhat fixed, also.

The dash has been qualified by several adjectives like scuttle; if it takes on some new shape we will get another word to add to the vocabulary.

The step is a running board or a side platform, or a long side step, or any other old name that comes uppermost. The variety of names almost seem to be everything by turns and nothing long.

We presume much of this confusion comes about by the engineer clashing with the coach builder in the use of terms both are accustomed to in totally diverged trades.

"Chassis" seems to stick, but it could be replaced by a word better describing the underbody or gearing to an English-speaking trade.

"Tonneau" was hard to surround by the native, and it is an ungrateful term to describe a single kind of carriage body, or car or coach body.

If a "touring body" is something made in which to tour, why use it generally as an open vehicle for every purpose other than touring?

Our "runabout" word is about the only fitting term that has so far been evolved from the muddle, and it had to be taken from the horse vehicle vocabulary. It fits its purpose.

"Garage"—a storing house for automobiles—is another awkward word that doesn't easily fit the mouths of most of those who have to use it for a living. Its pronunciation is wierd in many instances.

Chauffeur has become "shofer" for short. The engineer is responsible for this word, as he naturally thought a stoker should mess with the engine, so the word has been passed along to the confusion and dismay of all whose knowledge of French is just somewhat more lacking, if anything, than a correct knowledge of the pronunciation of their native idiom. It's a symphony of sound to hear the prosperous butcher's wife utter the word when talking about her automobile, accent on the "mo."

In commercial work the wagon maker's terms still persist. Strange the engineer has not given us gondola car, flat car, box car, or other names derived from a similar source. They, too, would have been assimilated.

In time, probably, all this will settle, as does muddy

water, and a clear, concise, appropriate and meaningful glossary of terms will become standard. Speaking for those who have to write about such things for a living, it is a consummation most devoutly to be wished for.

Distinctiveness

In another part of this issue we give the ideas of Rider and Driver on correct appointments in equipage, referring to automobiles.

The point is made that there is no real distinction, meaning isolated superexcellence of style, in the motor car. They are like peas in a pod.

Then it instances the chagrin and dismay of a society leader who had to take the dust of the car of the "wife of a poolroom magnate dressed rather vociferously," the cars being of the same make and exactly alike in body and style.

How anything different could be the outcome of the "quantity basis" which is the controlling plan of all automobile builders ,t would be difficult to explain. How it could be different under any conditions it would be hard to determine.

In the old days a Brewster brougham could be distinguished from a Healy brougham in just the same way. Each carried its distinctive elegance of line like a trademarked article, but they were just alike of their kind. The "poolroom magnate's" wife could invest the dollars of the poolroom in just the same way and achieve as much "front" as the "sassiety" leader, who several generations back had an ancestor lucky in his dealings in hides, pelts, tallow and real estate.

The fact is there is about the same distinction of line and sweep in the new vehicle body as was to be found in the better work of other times. The fault lies mainly, if fault there be, in the uniform color schemes of the painting, schemes carrying no especial or exclusive "cachet," or having no particular meaning save the one to look pretty.

There are auto vehicles on the streets of our cities turned out by master carriage builders, but they differ only in refinement of detail, and a beauty of line that it needs expertness to single out and appreciate. The poolroom magnate's wife couldn't appreciate them in years, and the social leader would not be cognizant of them after being pointed out over and over, by the enlightened salesman. Then she could parrot the fine points of her rig to her rival and get her money's worth in the envy and chagrin she was pouring all over the French hat of her dear friend (!)

There can be no multi variety of model by the Packards, the Pierces, etc. (the ones singled out for comparison), unless they build to order and separately, and even then the hand of the draftsman-artist will repeat its work over and over, just as a Corot, a Messonier, a Turner can be spotted by the art amateur as far as he can see them.

One thing needed for distinction is heraldic harmony in the body colors of the painting to be personal to the owner, and even this would have to be pointed out, explained, and drilled into the successful steel maker, or Wall street broker, whose kind are the staff of the social life. Usually the man really appreciative of such niceties is a fellow who could not own in fee simple the spare wheel on the motor car.

It seems to be the day of "standardization," then why not accept the peas in a pod?

HUGH CHALMERS AND HIS IDEAS

The United States is the most wonderful automobile market in the world—a market which will take care of an average production of perhaps 200,000 cars a year for a great many years to come.

But, like every other industry, the automobile business must continue as an economic manufacturing proposition. A few years ago they used to speak of the "automobile game." Building automobiles is not a game. It is a serious and staple business.

I believe that if the American market is not crowded, there will never come a time of serious slump or famine in the motor car industry.

The question of who will build the automobiles of the future is being threshed out today. The solution is being found in economic conditions. In my opinion the manufacturer who is building most surely for the future, as well as for the present, is building up a big plant in which to manufacture most all of the parts of his car. He is making automobile building a manufacturing proposition, which means that he is saving in the manufacturing cost wherever possible and putting these savings into better materials, better workmanship, more conveniences and finer equipment. Also, he is taking a small margin of profit, because he wants to market his car at the lowest possible price.

He is striving for big production—that is, production big enough to enable him to take every advantage of the markets in which he buys his raw materials. But he is carefully holding his production down to his own retail market. He is being careful not to over-produce.

Looking over the cars which stand well in the public estimation today, you will find that the same cars were well regarded, three, four or five years ago. The cars which are built today must be giving service five or more years from now if they are to continue in public favor. The time has passed when the entire production of a factory can be sold each year to a new class of people. Service counts. The automobile is no longer simply a luxurious toy. It is a necessity of our civilization; and the moment a thing becomes a necessity its possessor is more inclined to use it just as long as it will give good service.

There never will be built any piece of machinery that will not require service from the manufacturer. People will have accidents, and even without accidents, any piece of machinery which is used steadily over a long period of time will need a certain amount of replacement of parts.

The best assurance of permanency in the automobile industry is a big factory, a sufficient investment, a clean business record, and plenty of capital. Certainly those companies which have invested five and six millions of dollars in their plants are not risking such vast sums in any precarious enterprise.

For the manufacturer who is building up his business along these lines of permanency and high dollar-for-dollar value in his product, I believe the future holds unlimited promise. It only wants a complete understanding of the automobile buying public to assure that the worthy manufacturers shall succeed. It seems to me that an appreciation of honest principles in automobile building should not be a hard thing for the public to understand and to appreciate, for certainly it is to the best interests of the individual buyer to secure a car which is honestly built and honestly marketed, and which shall have, throughout its life, the backing of a sound and responsible manufacturer. I believe the individual buyer can not give too

much attention to these points. I believe it is quite as essential, if he expects to get service, and if he regards his purchase of a car as an investment, that he study the company which builds that car, as it is to study the features of construction in the car itself.

After all, the average driver of a car is not particularly interested in the kind of clutch, the type of lubrication system, or the method of cooling the motor, so long as all of these functions are performed in such a way as to guarantee the satisfactory operation of the car. What the owner wants is service—a car which has endurance, smoothness, reliability, comfort, convenience and good looks. Good looks is something every buyer can see. Convenience and comfort are qualities he can test out without unusual effort. Endurance, smoothness and reliability are largely matters of reputation. He must accept the experience of other owners of the same make of car. He must know the company and learn whether its cars have in actual service during the past several years proved that they possess these qualities.

CHANGING AUTOMOBILE TENDENCY

At the North of England Automobile Show there was noticeable, according to the Manchester Guardian, a distinct tendency on the part of British manufacturers to turn out cars in larger numbers and to reduce the number of models of any one make. Hitherto British makers have been producing as many as five or six different models for a single season, but it seems that they are beginning to concentrate on two or three. This has resulted not so much in a drop in price as an increase in the value given for the same amount of money. The writer in the Manchester Guardian continues:

The largest British pleasure car manufacturing company has completely reversed its policy and has given the keynote of the future to motor car manufacture in Britain. Instead of a multi-model program it has made a clean sweep and is producing this year approximately 4,000 of a single type of car—the 16-20 horsepower four-cylinder vehicle and a large number of 24-30 horsepower six-cylinder cars—while one very large six-cylinder model will be made only in batches specially as ordered. Thus for all practical purposes it is producing two models only. Other manufacturers are following the same plan, and wherever we turn it is plain that the multi-model program is something which must gradually be eliminated, for the simple reason that already a sufficient number of manufacturers are engaged in producing two or three types of cars, giving such value for money as can not be matched by any maker who divides an output, say of 1,000 or 1,500 cars a year, among four or six different models.

The private user apparently is able to appreciate what this means when applied to American cars, but he has evidently not yet grasped its application to home products. Because it is the largest this year, let us take the case of the Wolseley Co. It has abandoned its 12-horsepower model, the lowest powered vehicle it now makes being the 16-20 horsepower type. That machine has appreciable improvements over last year's 16-20 horsepower type, in particular, vastly better coach work and fittings. Yet by producing approximately 4,000 cars in 12 months it is possible to market it at a price not greatly in excess of that asked for the now abandoned 12 horsepower model. Further, this concentration on a single type makes for perfection of workmanship, because even the men in charge of automatic machinery know more and more about their work if they continue to produce pieces of a fixed size instead of making one size this week and another one the next week. If that is so with automatic production, how much more does it obtain in the case of hand labor, such as assembling cars and tuning them up.

There is a tendency to fit too many accessories to a car, so that it presents the appearance of a traveling shop window. That, however, is something which need not influence the purchaser, who will choose only such things as he wants. In foreign cars, such as many American makes, including the Ford, and in many home makes, such as the Humber, you have examples of cheap, low-powered machines which are marketed complete with practically everything needed for the highroad. There is a big move toward selling motor carriages at what Americans call either the "all-in" or the "drive-away" price.

From the strictly historic point of view, the keynote of the year is the advent of the reliable self-starter, of which there is only one supreme example at this period—an American device. This has not only demonstrated its efficiency in unique classes of tests conducted by the Royal Automobile Club, but also in the hands of many users of last year's models, and many more who have taken delivery of cars since the motor show in London. Certainly five years hence no large or medium powered car of any country will be marketed with a starting handle. At the current show you may see some very clever standardized devices in this direction.

SETTLEMENT FOR LESS THAN AMOUNT CLAIMED

The courts are not agreed on the settlement of undisputed demands by the payment of less sums. But, as the court of errors and appeals of New Jersey holds, 85 Atlantic Reporter, 354, the rule of law is that where a claim is unliquidated or in dispute payment and acceptance of a less sum than claimed, in satisfaction, operates as an accord and satisfaction. To constitute an accord and satisfaction in law, dependent upon the offer of the payment of a less sum than that claimed, it is necessary that the money should be offered in full satisfaction of the demand, and be accompanied by such acts or declarations as amount to a condition that if the money is accepted it is to be in full satisfaction, and be of such a character that the creditor is bound to understand such offer.

The party seeking to settle for a less sum than is claimed to be due must, by his words or conduct when making the offer, clearly inform the other of what is sought and expected. The transaction must be such that the condition is as plain as the tender, so that the acceptance of the tender will involve the acceptance of the condition. In other words, the tender and the condition must be incapable of severance; for otherwise the inference will not be drawn that the acceptance of the tender involves the acceptance of the condition. The condition that if a tender be accepted it shall be in full satisfaction of the disputed claim may be expressed in the check itself, or in the letter, or account, or receipt.

PROGRESS OF SAN FRANCISCO EXPOSITION

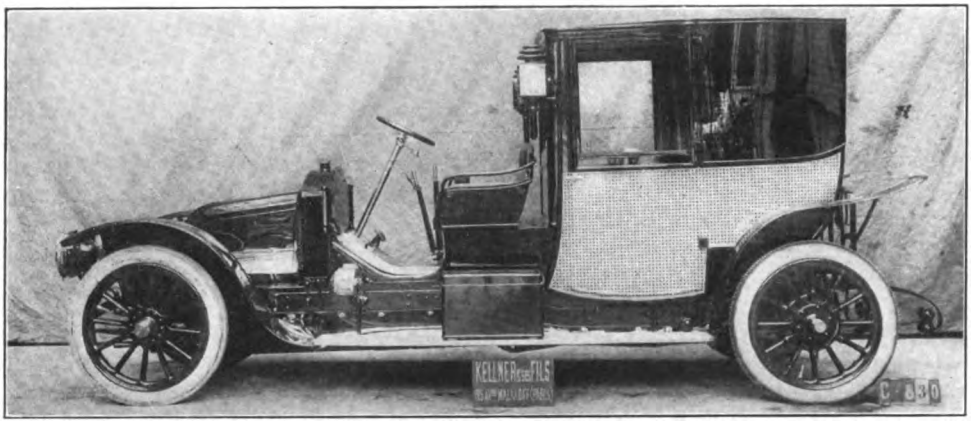
The advance of the preparations for the automobile exhibits at the Panama-Pacific International Exposition to be held at San Francisco in 1915 is a sufficient assurance that it will be the most comprehensive of its kind.

Foundations are now being laid for an exhibit palace, to be known as Automobile Hall, which is being erected at a cost of $250,000 by the National Association of Automobile Manufacturers. This place will contain examples of every phase of motor traction and motor accessories in use today. Nothing except the most modern of appliances will be on exhibit and in the classification which has just been completed by the Director of Exhibits, provision has been made for the presentation of features which are as yet but an idea, but which, by 1915, will be a reality.

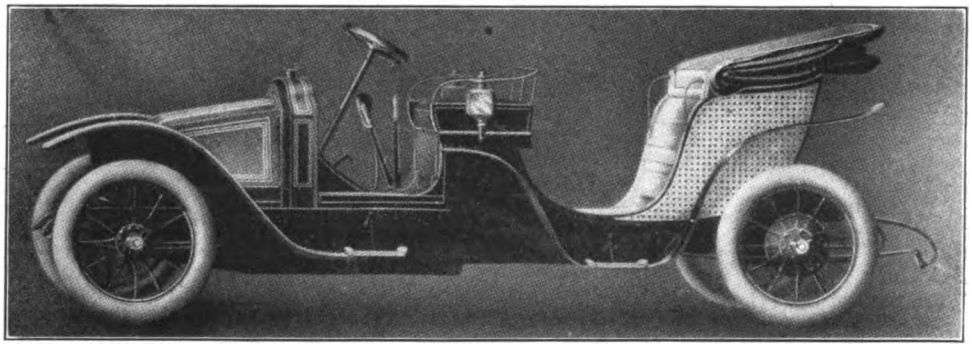
ENGLISHMEN WANT AMERICAN SOLID TIRES

The representative of an English firm of motor truck manufacturers opening up a sales business in Canada informs an American consul that he would like to receive catalogs and price lists from American manufacturers of detachable solid rubber tires suitable for motor trucks carrying a load of one to four tons. The number of the consular report is 10,546.

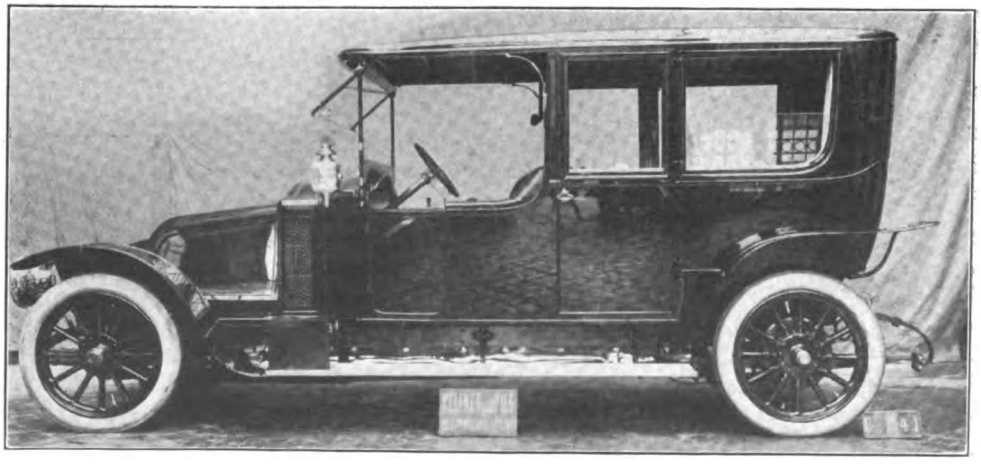
Most Recent and



TOWN CAR—Kellner et ses Fils

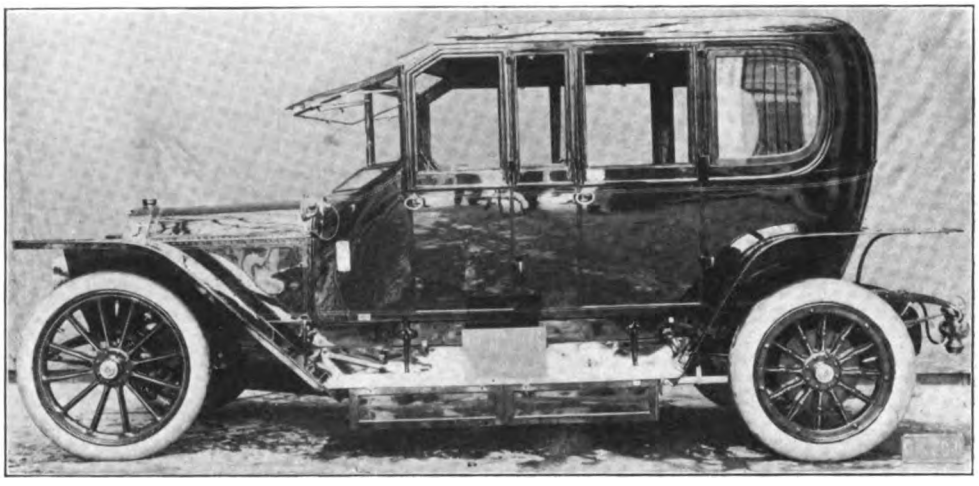


MILORD—Rothschild et Fils (Louis Dupont, publisher)



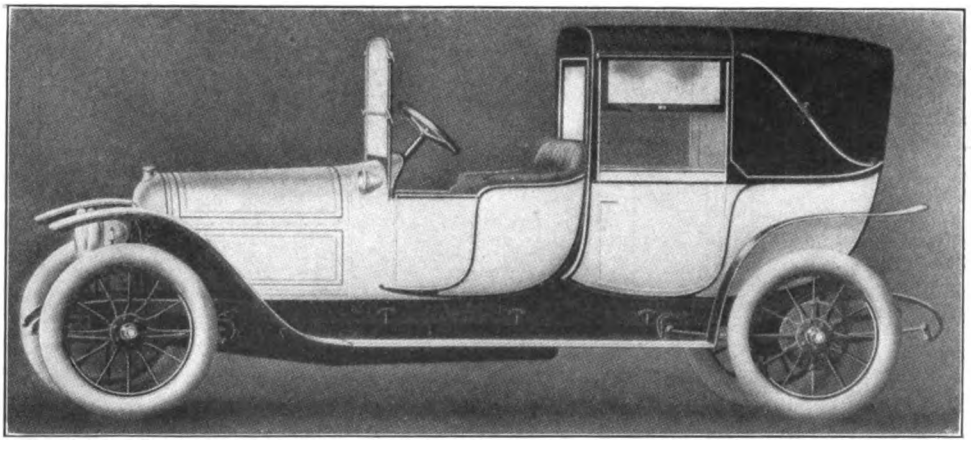
ROUNDED TOP—Kellner et ses Fils

Best French Styles

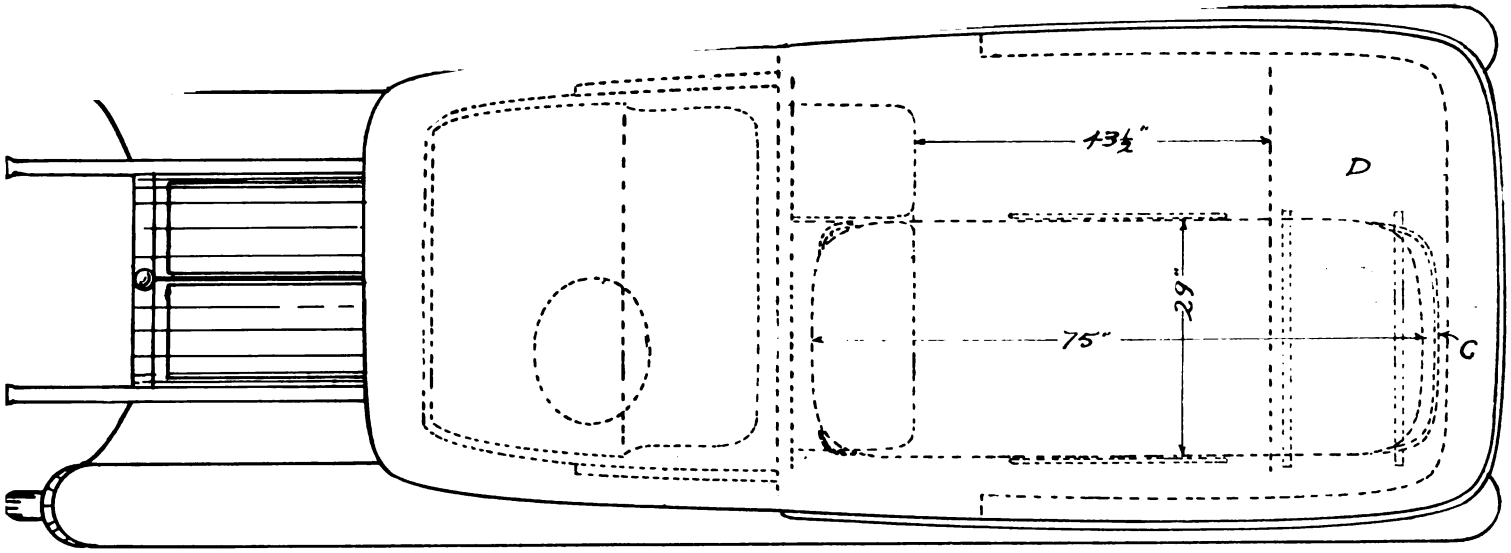


EGG-SHAPED (INSIDE DRIVE)—Kellner et ses Fils

VIS-A-VIS—Kellner et ses Fils

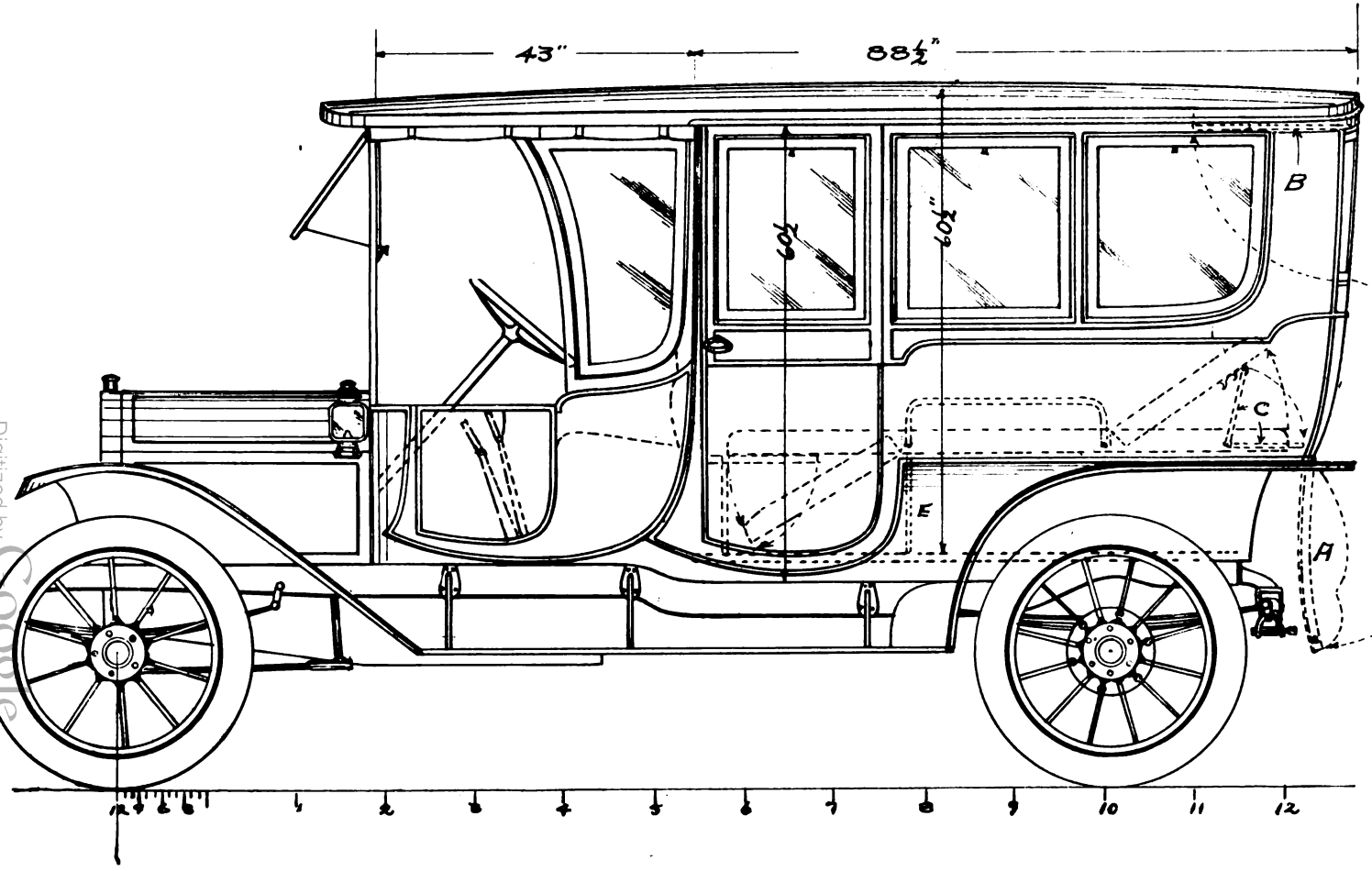


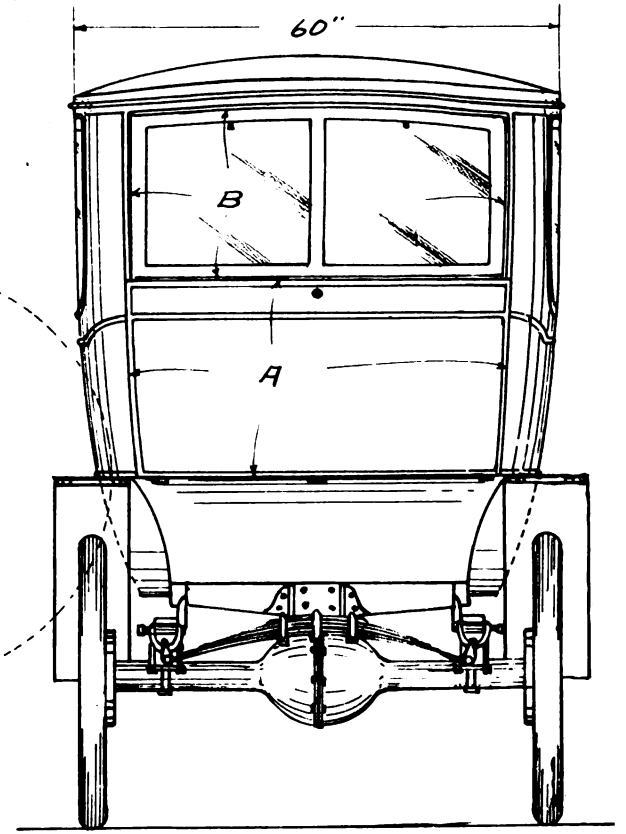
LANDAULET—Kellner Freres (Louis Dupont, publisher)



Combination Limousine Ambulance and Mourners' Car

See article opposite





COMBINATION LIMOUSINE AMBULANCE AND MOURNERS' CAR

(See illustration on opposite page)

The accompanying three illustrations show in detail the side elevation, the rear view and the plan view of a limousine body that is designed to serve as an invalid's car or a mourners' car.

As illustrated, the car is equipped for ambulance work and to make the change necessary for use as a mourners' car, it is only short work to remove the bed and substitute chairs in the middle of the body. It can then be made to accommodate eight persons, three on the rear seat, three on the middle cross seat facing forward and two on the front drop seats facing toward the rear.

The body is mounted on a 132½-inch wheel base chassis. having 36-inch wheels, and the drive is on the left side, the gasoline tank is under the front seat and there is plenty of power to pull the big load up any hill.

The name limousine ambulance or invalid's car is given to a type of car that is replacing the old time private ambulance. It is used largely for the transportation of patients that are not in the sense emergency patients and who desire to avoid the publicity that an ambulance creates. The bed is made so that the head and the feet of the patient can be placed at a near sitting position; and also the patient rides the reverse of the ordinary ambulance, i. e., facing forward. Small guide rails are placed on each side of the bed and this bed can be drawn out through the door A A, the head rest support C C serving as a handle for pulling out and pushing in the bed. Rollers are let in the seat frame D; this seat frame extends all the way across and that part unoccupied by the bed serves as a seat for the doctor or the attendant. At the front the bed rests on the drop seats and when it is desired to lower the foot of the bed a support, E, is dropped from the underside of the bed to take the place of the drop seat. The main support of the bed is the rear seat, D, and to this it is locked to prevent its rising up when the car swings on uneven roads. The substructure of the bed is 1¼-inch angle iron. At the rear the head rest is hinged and is separated from the subframe so that it can be raised by means of the support C, this support C being fastened to the subframe. At the fornt the subframe is cut to allow of the downward movement of the foot part. No locking device is used to support the front end at the horizontal, as it is either being carried or resting on the drop seat when the horizontal position is desired. Handles are placed at the front, and at the back the bar, C, is used; this is automatically made safe for use as a handle when the head rest is made to rest flat on the subframe; the pressure of the head rest throws a clip over the support C and locks it to the subframe. The size of the bed is 75 inches long by 29 inches wide, and provision is made for two persons to ride inside with the patient, one beside the bed at the rear, and one on the drop seat at the front. There is ample room for the occupant of either seat to move freely the length of the bed without disturbing the other.

The body design is according to the standard in vogue, the fixed intention being to make an ambulance that did not look like one and the proportions are such as to give ample room for the uses to which it will be put; the length of the body part is 88½ inches by 60 inches wide; the head room in the clear from the top of floor to the under side of the roof is 60½ inches; the side doors are 24 inches wide and the entrance at the back is 44 inches wide at the bottom, and the glass frame, B B, is made to swing up to the roof when the door A is opened. The locks of the door A are one on each side at the top and are operated from the outside by means of a loose handle inserted in the center just under the top moulding. The driver is protected by fore doors and cab sides that are removable. All glass frames are made to drop except those of the cab sides. Storm curtains are provided for use when the cab sides are not in position on the car.

The construction of the body is of wood framing and aluminum panels and mouldings, and the finish of the interior is leather trimmed smooth up to the waist line and above on the sides and the underside of the roof natural wood finish. Locker space can be provided under the rear seat D.

When used as a mourners' car, the extra seat is made to accommodate three people and it is placed in position across the body and occupies all the space from side to side; in the center is a portion of the seat that lifts up to allow of passage to the back seat. The space between the drop seats and the rear seat is 43½ inches, and if the middle seat is 15 inches from back to front and it is placed 10 inches ahead of the rear seat, the space between this seat and the drop front seats will be 18½ inches, which is fair room for the knees of the occupants of the seats facing. GEO. J. MERCER.

DISTINCTIVENESS IN EQUIPAGE

Perfection of bodies and appointments of motor carriages has progressed to a high degree in the practise of automobile manufacturers. The high grade stock car of 1913 is a wonderfully artistic, efficient and beautiful carriage, but it lacks just one qualification that makes for appeal to the man who wants something different from his neighbor.

Consider for a moment some of the high grade lines of cars. The barest novice can tell a Packard, equipped with stock body, at 100 yards. The Pierce-Arrow limousine, with its arched doors, cannot be mistaken; the Cadillac has certain indelible marks characteristic of its body manufacture; the Peerless, Alco and Locomobile, the Pope, Stearns and Oldsmobile all carry their identification so clearly that no one could mistake them.

Now all the cars mentioned are excellent motor carriages. As automobiles it would be difficult to criticise them. They are all good. But—the clerks in the stores; the urchins on the streets and the general run of the public can pick them out as far as they can be seen.

Of course, it may be very desirable, from an advertising standpoint, for some owners to be identified with their cars, but there is a considerable and growing class that seeks distinctiveness in its motor carriage equipment. Wealth is a condition precedent to the ownership of a big car, and the possession of wealth is not always an indication of social eminence or even of ordinary good taste. The person who has sufficient money to buy is welcome to do so, irrespective of any other qualification. The wife of a social climber of doubtful antecedents may own a big motor carriage, the exact duplicate of which is the property of the most distinguished official, social or financial leader.

Some very funny situations have been noted due to the promiscuity of automobile distribution. Last week, on Fifth avenue, two cars of identical description moved along in the stream of traffic. In the first was the wife of a former poolroom magnate, dressed rather vociferously; while in the second car was a social leader of international fame. The latter lady appreciated the remarks that were being made by observers all along the route, and thrice ordered her chauffeur to drop back out of range of obvious comparisons with the car in front.

Owing to conditions of traffic this was impossible, and the pair of magnificent big motor carriages proceeded for two blocks in procession formation, while the crowd grinned or was sympathetic, depending upon its mental angle and sense of humor.

The answer, naturally, is the custom made car.

Today, the idea of accepting what the automobile salesman has to offer does not appeal to everybody. There are not a few, but many, who have always demanded distinctiveness in their horse equipment, and they have carried the idea of some-

thing different from the ordinary run into their selection of motor carriages.

Each year there has been an increasing demand for the satisfaction of individual tastes, and in the future this demand will be more important than it is at present.

Take the case of a person endowed with physical characteristics out of the usual run. An extra large man or woman requires something different from the force of physical necessity, but that is not the main reason for the growing demand for distinctiveness.

Aside from the fact that a specially built body represents certain individual ideas to cover particular needs and can be as simply or as ornately finished as the taste of the buyer requires, the custom made body is the work of specialists and has that much advantage in comparison with ordinary stock bodies, no matter how graceful or luxurious they may be.

For the distinctive person who demands a distinctive carriage, the growing practice of buying the chassis and working out individual ideas to suit the particular case is making stronger appeal every day.

During the past two years, and especially during the present season, many sales have been lost to the automobile industry because John Smith would not buy a carriage the exact duplicate of which was owned by William Brown—just as milady who imports an exclusive model gown or hat from Paris will not tolerate its duplication.—Rider and Driver.

WEIGHT OF A VEHICLE BY SPECIFIC GRAVITY

The science of carriage building, unlike that of the engineering trades, has not reached that point of general perfection which enables the designer, as it does an engineer and a naval architect, to trace the weight of structures from their drawings, by the data of specific gravity, as applicable to the various materials, used either in engineering or in naval architecture.

Now that the trade has to grapple with the manufacture of a new type of vehicle, as offered in the motor car, we think it is imperative that a more exact and higher knowledge of scientific carriage building should be attained, because it is of the first importance to those desirous of keeping their toes to the line of march mapped out by the new conditions imposed in the construction of those vehicles.

The science of finding the weight of a carriage, as determined by a drawing, is an unknown factor in practical coach making; although a carriage embodies within itself some of the most beautiful problems known in practical science, it is painful to know how limited this knowledge is, and how few coach makers there are who ever deviate from the well worn track of building their work by the rule of gradual reduction, and watch those processes from the standpoint of practical experiment; that is a sure process without doubt, but it wants engrafting on to it a surer and swifter method than that which is gained by practical experience. This science teaches us, for after all, science is only the registering of exact thought.

With pinching and paring it frequently happens that a brougham or landau ran a hundredweight more than was estimated, by the standard of robbing Peter to pay Paul, and to ask a coach maker to determine the weight of a carriage from a drawing on the blackboard was simply to meet with derision and contempt, and so it is yet up to a certain point.

We move in too rapid times to waste our energies upon the whims and fads of old habits which are hard to beat off, and circumscribed grooves difficult to get out of.

We are not concerned about the lightness of a carriage; what we are dealing with is the problem of how to find or arrive at a given weight, before a job is put in hand, and that by the standard of specific gravity, to show how a job should thus be measured up to give the approximate weight sought.

The weight of all woods, metals and ivory is measured scientifically by their specific gravities, that is, a cubic inch of water is taken as the unit of weight measurement; a cubic inch of water weighs 252 grains, so that when the specific gravity of any metal, timber or ivory is known, the weight of structures can be calculated from them. Thus, the specific gravity of iron varies, some brands being heavier than others; the same is the case with timber. A cubic foot of iron weighs from 477 pounds to 480 pounds, and a cubic foot of mild steel 491 pounds; a cubic inch is 0-284 pounds, and that of a square foot 1 inch thick 40.94 pounds. We may take the best wrought iron used in coach making to equal in density that of mild steel, so if we divide this by 12 it will give us a weight near enough for practical purposes; thus, a bar 12 inches long and 1 inch square would weigh 3 pounds 6½ ounces, but to be more practical, perhaps, if we cut a piece of iron 1 inch square and 12 inches long from a bar, it will weigh 3 pounds 5 ounces, or thereabouts, iron being a little lighter than steel. Coach making is not an exact science, like engineering, therefore great accuracy is not demanded, that is, decimal exactitude.

If all the ironwork of which a carriage consists is measured up and computed into bars 1 inch square, we very easily get at the weight of the ironwork; in measuring the length of tires on the wheels, multiply the diameter by 3.1416; the product will give the circumference; another method is to multiply the diameter by 3, and add 1/7 of the diameter to the product, which will give the circumference very nearly; or the diameter can be multiplied by 22 and the product divided by 7; those methods will be found in engineering text books, but there are other simple ways of arriving at the same result; there is no right way in doing a thing; as long as the result is correct any way is the correct way in arriving at it. A man who is conceited enough to proclaim his way the right way of doing a thing, when there are other methods of doing the same thing equally as well, makes himself simply dogmatic. Any way is the right way, if the result is satisfactory and correct, but it is, of course, as well to remember that one way of doing a thing may be shorter and quicker, and thus establish itself as the best, and therefore the right way—the simplest ways are the best ways.

WAGON MAKERS AND BLACKSMITHS PROTECT THEMSELVES

Through the efforts of the officers of the Blacksmiths, Horseshoers and Wagonmakers' Association of Kansas, a bill has been passed into the stage of law that affords the creditor in this trade great protection. It ought to be passed in other states. Below is a copy of the law:

Sec. 1. That a first and prior lien is hereby created in favor of any blacksmith, horseshoer or wagonmaker upon any goods, chattels, horses, mules, wagons, buggies or other vehicles or automobiles and any farm implements of whatsoever kind, which shall have come into the possession of such blacksmith, horseshoer or wagonmaker for the purpose of having work on said property, or repairs, or improvements in anywise appertaining thereto, and said lien shall amount to the full amount and reasonable value of the services performed. And shall extend to, and include the reasonable value of all material used in the performance of such services.

Sec. 2. That said lien shall be filed for record with the recorder of the county in which said services were rendered within sixty days thereafter.

Sec. 3. That said lien may be enforced and foreclosed as chattel mortgages are now enforced and foreclosed.

Sec. 4. This act to take effect and be in force from and after its publication in the official state paper.

A NEW RUBBER COMPANY IN EAST LIVERPOOL, OHIO

The Morgan & Marshall Co-operative Tire and Rubber Co., with $500,000 capitalization, with R. J. Marshall, I. M. P. Marshall and Morgan Howell as incorporators, expects soon to begin the construction of a factory at East Liverpool, for the manufacture of rubber tires, tubes and sundries.

Technical Schools in Europe

At a meeting of the executive committee of the Carriage Builders' National Association, in Atlantic City, N. J., last September, Mr. Heergeist was commissioned to visit the principal vehicle drafting and technical schools of Europe, and to make a report thereon for the benefit of the members of the association and of the trade in general. The report in part follows:

The Newcastle (England) technical school for carriage draftsmen is an excellent one in every way. It was organized about thirty years ago by John Philipson, of the firm of Atkinson & Philipson.

The Newcastle institution had its inception in one of the workshops of the Atkinson & Philipson factory, and from the beginning was open not only to the apprentice boys, but also to the journeymen mechanics. Foremen from the factory, who were entirely capable of the task, were selected to act as teachers.

There is another large and old established concern in the same city, then managed by Sir William Angus & Co. (now Angus, Sanderson & Co.), who almost immediately recognized in the new school an institution which they believed must have a brilliant future, and they joined Mr. Philipson in the furthering of such a good work. This co-operation was gladly accepted by Atkinson & Philipson, and the school has been conducted jointly by the two firms since that time.

The beneficial effect of the carriage building school soon became apparent to the city authorities of Newcastle, and the school was invited to make use of the better teaching facilities afforded in one of the municipal educational buildings.

In due course of time the students who had entered the school as apprentices grew into full-fledged mechanics of a high grade, knowing how to lay out their own work and taking the utmost interest in their trade. New pupils entered to take their places, and so the cycle continues. It is almost needless to add that the Newcastle carriage factories, since the beginning of the technical courses, have not been embarrassed by any scarcity of high grade workmen.

After the city began to take an interest in the school it was located first in one of the buildings of Durham University, but as the institution grew it was assigned rooms in Armstrong College.

In addition to the assistance granted by the city of Newcastle, the school is also under the patronage of the Institute of British Carriage Manufacturers, the City and Guilds of London Institute and the Worshipful Company of Coachmakers of London, by whom annual prizes are awarded. Local prizes are also offered for work done in class and at home, the latter including practical body and gear work.

Notwithstanding all this outside assistance, a great deal of the credit for the continued success of the school, especially in later years, must be accorded to the honorable secretary, William Philipson, son of John Philipson, the founder, and to the late Sir William Angus, who took the utmost interest in the school. John Philipson, also one of our honorary life members, brother of William, and Vernon F. Bedford, the official teacher and a superintendent in the Angus factory, have also done much good work in the interest of and for the advancement of the school.

At times when the official teacher finds it impossible to be present, interesting and instructive lectures are given by foremen from the shops.

In the Newcastle courses, while the subject of drawing occupies a prominent position, it is not subordinated to other branches of instruction that confer a more general acquaintance with the various branches of the coachbuilding art. Some of these studies are included in such general terms as, "Principles of design as applied to carriages and motor cars"; "Mechanical principles that govern the size and weight of carriages and motor cars"; "Sizes of springs under various weights," and "the draught and suspension of bodies." The uses of all the different carriage building tools, general instruction in body and carriage part making, smith and vise work, axle making, trimming and painting are all constituents of the Newcastle courses of technical instruction.

Free-hand and scale drawing of parts of carriage and motor bodies, made without patterns, form an important part of the work in the junior class, and are considered indispensable as a preliminary training tending toward originality in designing and construction. The senior class receives instruction in the perspective drawing of carriages and motor cars, and is initiated into the use of various labor saving machines, methods of planing, economical cutting of materials, etc. The senior students are also given instruction in the higher branches of carriage and motor body building.

In addition to the work of the Wednesday evening classes, the juniors, without exception, attend on other nights some of the other classes of the college, where they receive instructions in linear drawing, theoretical and applied geometry, etc. The seniors go to other departments of the vast buildings where they study physics, mechanics, building and construction, strength of materials, etc. These studies outside of the regular carriage course are not optional, but must be taken before a full technical certificate, satisfactory to the examiners, is granted to the student.

The Newcastle school, as shown above, is dependent for its supply of students upon two factories only, yet so great is the interest taken by the workmen in these shops that there are always from 30 to 40 students regularly attending the classes.

Schools of importance, each doing the work of its home district in the best possible way, are located at Huntington, Leighton-Buzzard, Dartford, Manchester, Wolverhampton, Birmingham, Liverpool, Newport-Pagnell, Northampton, Acton, Chiswick and Southport. All of these schools are well supported, being liberally assisted financially by local vehicle builders and patronized with equal liberality by the ambitious mechanics from the shops in the neighborhood.

The Polytechnic Annex, in London, furnishes quarters for one of the oldest technical schools in Great Britain.

Technical classes expressly designed for the carriage trade were not commenced in London until the year 1800, when Thomas Coward, an educated and intelligent foreman with Thrupp & Maberly, inaugurated the first courses in coach building. A short time afterward the classes in the Polytechnic Annex, Regent street, were opened and successfully carried on under the supervision of John Robertson, manager for Hooper & Co., a firm that has done a great deal for English technical education in the line of carriage building. Many of the students trained by John Robertson have become teachers in London and other parts of the country, and among them are Louis J. Butler and Ernest Bailey, the present headmaster of the Polytechnic classes.

Louis J. Butler succeeded his former teacher, Mr. Robertson, and it was during the years of his incumbency that the Institute of British Carriage Manufacturers approached the Polytechnic and the London County Council with the proposition of establishing a regular day school of carriage building. Up to this time the sessions had been held on stated evenings only. The primary object of this day school was to furnish a course of training to the sons of coach builders and others, thoroughly fitting them for positions in their after life in the trade. The proposition was accepted by the Polytechnic and the carriage builders' day school became an accomplished fact.

Louis J. Butler was appointed first headmaster and carried on the day school for seven or eight years, relinquishing the work finally on account of failing health.

Upon the retirement of Mr. Butler, Ernest Bailey, the present headmaster, was chosen. The introduction of motor cars necessitated a rearrangement and to meet this need Mr. Bailey introduced a scheme which provides for practical woodworking and full-size working drawings in the mornings, and lectures, drawings, in perspective, to scale, and in colors, in the afternoons. All of this work has been planned with a definite bearing on the designing and construction of automobiles. Evening classes are conducted five nights in the week, Saturday nights being excepted. The general lay-out of the week's work is as follows:

Monday—Full-size drawing and practical painting.

Tuesday—Lectures and drawing.

Wednesday—Half full-size drawing, practical wood and smith work.

Thursday—Lectures and designing.

Friday—Practical woodwork and instruction in trimming.

Some of the reasons for the unquestioned excellence of the British schools are to be found in the intense interest taken in the work by all the carriage and motor car builders of the kingdom; the capacity and enthusiasm of the teachers, all of whom seemed to be in love with their work; the young apprentices also are encouraged by the manufacturers, made to feel the necessity for higher technical education and, when necessary, further assisted in prosecuting their studies to a successful conclusion.

In Brussels I found the style, quality and finish of the coach work equal to that of any other country, yet there is no technical school for the carriage trade in Belgium. This would seem to indicate that there is no intimate relation between technical schools and high-class factory products. But it needs only the explanation that the Belgian carriage builders depend upon Paris for technical education, and many of the best workmen were trained in the Paris schools. The Chambre Syndicale du Carrossiers de Belgique held a meeting last year, with a view to bringing the educational advantages of Paris nearer home through the establishment of a school in Brussels.

The plan, as tentatively adopted by the Belgian association, contemplates the formation of a sub-organization which would be responsible for the management of the school. A capital of 32,000 francs would be required to furnish a building, the lower story to be utilized as a meeting place for the Chambre Syndicale. It is suggested that a teacher be engaged for each department, who should be an advanced practical man, experienced in his special branch of the motor car trade. Apprentices, helpers and journeymen mechanics would be taken under instruction and the work produced be sold at a reduced price to members of the association. The 32,000 francs are to be invested for five years, a certain amount being retired each year, and eventually the school would become self-supporting. The institution would be conducted for the benefit of the members of the Belgian Chambre Syndicale, the accessory trades and the motor car industry in general.

As compared with conditions in England and Belgium, we found in Germany a somewhat different state of affairs. There is in Germany at present but one important technical school for carriage builders, that one being managed by the city authorities of Hamburg. The school occupies pleasant quarters in a large building which is devoted to many kinds of technical education covering the principal trades. It is conducted in a manner similar to that of the City and Guilds of London Institute.

In one portion of this great educational building is located the Carriage Building School of the city of Hamburg, Prof. F. Behnecke being teacher of the day school, with C. Dagering and R. Thiele as teachers of the night classes. The day school is an advanced institution whose purpose comprehends the training and instruction required for a general education in vehicle building, with a knowledge of the various branches, so as to qualify the pupils to conduct carriage shops on their own account or to direct the plants of their employers.

The minimum age requirement in this school is seventeen years; the applicant must have worked in the carriage or motor car shops, and must be sufficiently familiar with vehicle building to know the names of all the parts used in carriage and motor bodies, and the names and uses of all the tools and machinery. Besides, a common school education is indispensable before entering the school. Some knowledge of geometry and geometrical drawing is also required. Pupils who have attended trade and manual training schools are admitted to the classes. Those who are deficient in these branches must go through an examination, and if not up to the standard must take evening and Sunday lessons in the trade or manual training schools.

The Hamburg carriage day school comprises an upper and a lower class, and each has a term of six months. The lower class begins about Easter and the higher class in October. The expenses for a six months term are 60 marks ($15), and for foreigners 100 marks ($25) in advance. Hamburg being a "free city"—a state in itself—those not born in Hamburg are considered "foreigners."

The rules and regulations appear to be unnecessarily lengthy and complicated, and the work very exacting, but, as the professor told me, "it is precisely these minor details and the strict supervision of the work that has made this school one of the most select as well as one of the most practical in the highest education of foremen, managers and employers."

In both the lower and higher classes drawings are supplied to the pupils as patterns from which to model their own work, and this series of charts is very complete, consisting of 40 of small size and 32 of larger dimensions. These drawings gave me an insight into the reason why this school has made such a remarkable success and why it has such a wide reputation.

The Bergmann School, in Berlin, had not been in operation for about a year previous to my visit, but while it was in operation it was one of the most advanced schools of its kind. We inspected the quarters formerly occupied by the students and found them ideal for their purpose. This school was carried on by Prof. Bergmann, without any outside assistance, and when we take into consideration this gentleman's undoubted abilities his failure to maintain the school must be considered good evidence that such an institution cannot be carried on single-handed and without the co-operation of the trade for whose benefit it is conducted.

In Vienna, designing and building sample carriages by students is a government prerogative, and their system again presents some points of dissimilarity as compared with others, although the same object is gained, that of teaching the design and construction of motor cars.

The Austrian Bureau of Public Works in Vienna supports an industrial establishment in which sample carriages and automobiles are designed and built by pupils desiring to perfect themselevs in the art of constructing work. Five different trades—designing, body building, smithing, painting, trimming and finishing, all most difficult to learn—are taught in this school. This establishment is open to employers, workmen and helpers, and all those between twenty-four and forty-five years of age are eligible.

A full course in building carriages in the white occupies eight weeks; body and smith work, or painting and trimming, six weeks, all ten hours a day. This time may be extended, however, in special cases, and the course may even be repeated when desired.

The employers may drawn 20 crowns a week and the helpers and workmen 17 crowns a week; besides railroad fare is paid to those living outside of Vienna. These schools have been established about three years, and the results have been exceedingly satisfactory.

All the drawings and writings made by the workmen are their own property, while the bodies, finished carriages and automomiles are sold to those who have made them, and are auctioned

off to the highest bidder. This is done not only to prevent competition with other concerns, but even to destroy the thought of competition.

The Paris schools are in a most flourishing condition, and are conducted on a simple plan, but with considerable variation in their teaching facilities. The largest and most popular school is the Cours Professionels, situated in the Rue Desrenaudes. It is sustained and managed by the Chambre Syndicale de Carrosserie de Paris et des Departments, which is the French equivalent for our own Carriage Builders' National Association. The Chambre owns the large two-story building, the upper floor of which is arranged as a well appointed school room, containing all the conveniences for teaching and accommodating 100 pupils and seven teachers. About 60 applicants were on the waiting list at the time of my visit, in addition to the 100 who were receiving instruction at that time. All the teachers are practical mechanics, employed by prominent firms as foremen, managers and superintendents of body and smith departments, and constitute the best obtainable talent of Paris.

About 35 sample drawings are owned by this school, made originally by the most expert body and carriage part makers. These are lithographed in large size, with the explanations printed directly on the sheets. They are mounted on heavy cardboard and are very handy for reference and for drawing from.

Instruction is absolutely free, the pupils paying no tuition fees whatever. At the end of each term an award is made for meritorious work, sometimes in money, sometimes in drawing instruments or books relating to the industry.

One of the professors, Louis Peysson, director and manager, has been connected with this school since 1890.

There was also founded in Paris some years ago, with the cooperation of the city authorities, a school in which the instruction is purely oral. The city furnishes the building as its share of the work, and up to the present time one of the experts attached to the French vehicle journal, Le Guide du Carrossier, has been acting as teacher. The school serves excellently for about 40 young mechanics. The courses are intended for apprentices not far advanced in their profession, and the instruction consists of making, under the eye of the teacher, the different operations on working drafts and carrying them out in wood to fit the body. This school meets twice a week, on Tuesdays and Saturdays, from 8 till 10 o'clock in the evening. The acting principal of the school at present is M. Desir, one of the best carriage and automobile designers in Paris.

So far as results are concerned, there is another school in Paris that has attained unusual prominence. This is the one founded by Brice Thomas in collaboration with Albert Dupont, the same year in which Guide du Carrossier was founded, in 1858. During the many years since its organization this school has been open for the instruction of young men who were ambitious to occupy responsible positions, either in the offices or shops of the most prominent carriage and automobile establishments. Here the drafts are done in full size and the scale drawings in outlines, shaded in black and in colors, the practice of all these processes being highly perfected. The reputation of this school is world-wide, and hundreds of its pupils have gone to all civilized countries, from Chile to Russia. The two teachers now in charge are M. M. Desir and Proguitte.

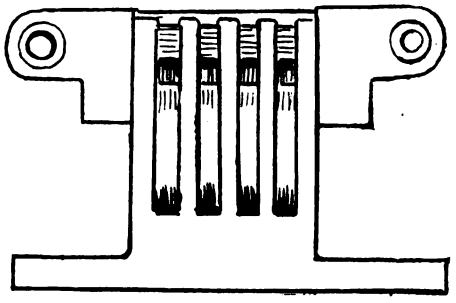
Still another school is conducted in the Municipal Building, 29 Rue de Mestre, of which Gustave Tiennet is professor of carriage building for the city of Paris. Here there is room for about 25 young mechanics, who, we would judge from their appearance, averaged over twenty years of age. M. Tiennet is a thoroughly practical mechanic and designer, and he knows working drafts from beginning to end. In this school, as in that of the Cours Professionels, half-size bodies, with and without panels, were used for demonstrative work. All of them could be taken apart when desired.

There are other drawing schools in the municipal building, where free hand, line and perspective drawing are taught. The young men may take all of these courses, and they are all free of charge. The municipal school is more practical in its nature than that of the Chambre Syndicale, and helpers who go there to perfect themselves in piece-work receive an excellent preparation for their work.

INVISIBLE HINGE OF MANY PURPOSES

The amount of hard work that falls upon the hinges of automobile doors is all out of proportion to the amount of consideration that the average car owner bestows upon them, unless they allow the door to sag, or project so much as to be more than ordinarily unsightly.

The principle of the Soss hinge is that of a joint made up of a number of bearing surfaces or plates which slide together



and fold into a recess in the door post when the door is closed. When the door is closed the plates in the hinge lock together and prevent rattling as well as holding the door firmly and closely in its place and so preserving the smooth outward appearance of the body. The plates which serve as foundations for the hinge are so formed that water cannot work past them and into the wood to cause decay; the removal of two screws from each hinge permits its removal from the car without disturbing the main fastenings. The Soss hinge is adapted to both straight and curved construction.

UNITED STATES DEPARTMENTS OF COMMERCE AND LABOR

The act of Congress creating the new department of labor changes the name of the former department of commerce and labor to the department of commerce and the designation of its head becomes secretary of commerce.

The principal effect of the change on what has heretofore been known as the department of commerce and labor is the removal of the bureau of labor, the bureau of immigration and naturalization, and the children's bureau, with all their officials, employes, possessions, files, etc., to the new department. These bureaus, however, will continue to perform their usual functions until these are modified by act of Congress or by the policy of the head of the department of labor.

The bureau of immigration and naturalization is divided into the bureau of immigration and the bureau of naturalization and the titles chief and assistant chief of the division of naturalization are changed to commissioner and deputy commissioner of naturalization. The name of the bureau of labor is changed to the buerau of labor statistics, and the designation of its chief is commissioner of labor statistics.

The act referred to describes the purpose of the department as being "to foster, promote, and develop the welfare of the wage earners of the United States to improve their working conditions, and to advance their opportunities for profitable employment. The act made the change effective on March 4, 1913, and the new department is now performing its duties. All questions and other communications bearing on labor subjects should be addressed to the department of labor instead of the department of commerce and labor as heretofore.

The work of the bureaus and offices remaining in the department of commerce will not be materially changed. There are

nine of these—bureau of foreign and domestic commerce, bureau of corporations, bureau of lighthouses, bureau of the census, bureau of fisheries, bureau of navigation, bureau of standards, coast and geoedtic survey, and steamboat-inspection service.

The bureau of foreign and domestic commerce, formed last year by the consolidation of the bureau of manufactures and the bureau of statistics, is charged in general with the duty of fostering, promoting, and developing the various manufacturing industries of the United States and their markets at home and abroad by gathering and publishing all available and useful information concerning such industries and markets. Part of the information published by the bureau is furnished by American consular officers, whose reports are edited and published in Daily Consular and Trade Reports and in special monograph series. The reports of special commercial agents of the department of commerce, traveling both abroad and in the United States, are also published in monographs and distributed among the manufacturing interests of the country. The bureau of foreign and domestic commerce compiles and issues the import and export statistics of the United States, and the tariffs of foreign countries. Other activities consist in handling a heavy volume of correspondence, communicating news of opportunities abroad from American firms, etc.

The bureau of corporations is authorized to investigate the organization, conduct, and management of the business of any corporation, joint stock company, or corporate combination engaged in interstate or foreign commerce, except common carriers subject to the interstate commerce act, and to collect for the use of the President information concerning such corporations.

The bureau of lighthouses has charge not only of lighthouses but of lightships, buoys, and all other aids to navigation along the coast of the United States and possessions and along many of the lakes and rivers.

The work of the bureau of the census includes, besides gathering statistics regarding the population every ten years, the collection of figures on the extent of various manufactures every five years, and making various special investigations from time to time.

The propagation and suitable distribution of food fishes, the development of fish culture, and the study of the fishing industry of the country comprise the work of the bureau of fisheries.

The bureau of navigation is charged with the general superintendence of the commercial marine and merchant seamen of the United States except in so far as supervision is lodged with other officers of the government.

As the name implies, the bureau of standards has custody of the standards of weights, measures, etc., makes comparisons of government standards with those in use throughout the country, tests and investigates physical constants and properties of materials for governmental and private interests, in addition to having other related duties.

The coast and geodetic survey is charged with the survey of the coasts of the United States and coasts under United States jurisdiction, and the publication of charts covering these coasts. The steamboat inspection service has charge of the inspection of steam vessels, licensing the officers of vessels, and administering the laws relating to such vessels and their officers for protcetion of life and property.

21,939 MOTOR TRUCKS RECORD OUTPUT IN U. S. FOR LAST YEAR

Interesting statistics pertaining to the manufacture and distribution of commercial motor vehicles in this country are contained in a statement just issued by the National Association of Automobile Manufacturers. These statistics are based on a census of the industry conducted under the direction of the association's commercial vehicle committee.

The total output of commercial vehicles of all kinds and types reported for the year 1912 by 170 companies was 21,939, as compared with a total of 10,655 reported for the year 1911 by 85 companies, and 10,374 reported for all preceding years combined up to the end of 1910 by the same 85 companies. It is believed these companies represent about 75 per cent. of the total production of the country, while the 170 companies reporting for 1912 and 1913 probably represent about 90 per cent. of the total output.

Most interesting of all, however, is the estimated production for the current year, which is 51,588.

Total value of the vehicles reported made in 1912 was $42,942,828, and of the estimated reported production in 1913 $98,288,872. These figures compare with an aggregate value of $22,292,321 for the vehicles produced in 1911 and of $20,485,231 for all vehicles manufactured prior to the end of 1910. This tallies with the 200 per cent. annual rate of growth shown by the figures covering the vehicles themselves.

Although 280 gasoline vehicle manufacturers and 32 vehicle makers are listed in one of the leading automobile directories, the association has been unable to elicit replies to communications of any nature from about 40 per cent. of them, from which it is assumed that they are not very active or important. Reports received from the 170 companies are classified as follows: Gasoline vehicle makers, 140; electric, 20; mixed system, 3; gasoline fire apparatus, 7; tricars, 3; tractors, 2; steam, 1. The gas-electric vehicles and the tractors are made by the electric and gas vehicle makers. Analysis of the reports show that the largest and most rapid increases in numbers have been made in the 1,000, 1,500, 3,000, 4,000, 6,000 and 10,000-pound capacities in gasoline vehicles, and in the 1,000, 2,000, 4,000 and 7,000-pound sizes in electric vehicles.

There has been a notable tendency to change models, particularly among the gasoline vehicle makers. Taking account only of companies making full reports for both years, 1912 and 1913, it is found that 35 models have been dropped by the gas car makers and 44 new models added, while the electric vehicle makers have dropped twelve models and added five. The changes are most pronounced in the 2,500, 3,000, 5,000, 1,500, 2,000, 3,000 and 7,000-pound capacities in electrics.

The mean average price of all the commercial vehicles produced in 1912 was $1,957.37; that of the gasoline cars $1,868.95, and of the electric vehicles, $2,465.18. In 1911 the average value of all gas trucks sold appeared from the records to be $2,079.16, and for all preceding years combined was $1,955.70, while in 1911 the average price of all electrics reported was $2,759.66, and for all preceding years was $3,369.72. Fluctuations in prices of the various sizes of both gas and electric vehicles over a period of years show that the prices of the 1,500, 3,000, 4,000, 8,000 and 10,000-pound sizes of gas vehicles have decreased materially, while the prices of the 2,000 and 6,000-pound sizes have increased notably. In electric vehicles the average prices of the 1,000, 2,000, 4,000, 8,000 and 10,000-pound sizes have been reduced, while in the 1,500, 3,000, 7,000 and 11,000-pound sizes they have increased.

LATIN-AMERICAN COMMERCE WITH THE UNITED STATES

Exports from the United States to Latin-America will approximate one million dollars for each business day of the current fiscal year, or practically three times as much as a decade ago. Returns thus far received and compiled by the Statistical Division of the Bureau of Foreign and Domestic Commerce indicate that the value of merchandise exported from the United States to Latin America in the fiscal year 1913 will approximate 325 million dollars, against 115 million in 1903. The share of our exports now sent to Latin America is over 13 per cent., as against 8 per cent. in 1903. Meantime the imports from there have doubled, the figure for 1903 having been 226 million dollars, against an estimate of 460 million in 1913. The share which merchandise from Latin America forms of the imports into the United States was, in 1903, 22 per cent., and in the current year about 26 per cent.

Paint Shop

DRIERS

Some years ago probably not many painters knew anything more about driers than that they caused paint to dry, and that some were thick as tar, some as thin as water, and some in a greyish paste, like putty. Today, it would scarcely be safe to say that any painter is in such utter ignorance concerning one of the most important articles he uses, as prevailed two decades ago.

First, let us note that it is spelled driers and not dryers.

Next, it is important to remember the various substances which give to the compound driers their peculiar siccative quality. These are:

Red Lead	Manganese Borate	Zinc Oxide
Litharge	Manganese Oxalate	Zinc Sulphate
Lead Acetate	Manganese Oxide	Ferrous Sulphate
Lead Borate	Manganese Sulphate	

The first group, the lead salts, are used most; the second group are extensively used; the third group is seldom used.

Red lead is one of the most anciently known pigments. There is only one way of making it, first converting the metallic lead into monoxide of lead by heat, and then converting this into red lead by a very simple operation. Briefly, the red lead is formed by the action of air on the surface of the molten metal. The lead takes up a good deal of oxygen, which gives it its valuable drying properties. One hundred pounds of metal yield about 108 pounds of red lead. It is liable to be discolored by sulphurous gases, as indeed all lead preparations are. Hence, its action on pigments like ultramarine, cadmium yellow, Naples yellow, etc., is injurious, and should not be used as a drier for these colors. Red lead is a better drier than litharge. From ¾ to 1 lb. of red lead will dry 200 lbs. of oil. Of litharge, about 1 lb. to the 100 lbs. of oil is required. This is not a great difference, but is sufficient to show that the one drier is stronger than the other. Both these lead salts are used in making boiled oil.

Litharge—This is the red lead in its first stage—monoxide. It dissolves in both dilute nitric and acetic acids. These give nitrate or acetate of lead. Hydrochloric acid, by boiling, gives the chloride of lead. Sulphuric acid does not dissolve it, but with it forms insoluble sulphate of lead. Litharge is a very strong drier, and years ago—likely within living recollection—was the only drier popularly employed by painters.

Lead Acetate—After dissolving red lead or litharge in acetic acid, the solution is evaporated down to dryness, when it assumes a crystalline form. This will dissolve readily in water and, to some extent, in alcohol. As a drier, painters will readily recognize it as patent driers, or sugar of lead, as the druggist and others may know it. It is not as strong a drier as litharge, but is more useful on certain kinds of work, such as greasy surfaces, and in dead white work. Not much of it is used nowadays, though it is made, and sold in all stores. It does not discolor paint, which darker driers do. It is not safe with many colors.

Lead Borate—This salt is prepared by adding a solution of borax to a solution of acetate or nitrate of lead. The precipitate which follows is collected, washed and dried. As a drier, it is nearly equal to litharge, and is largely used, both in boiled oil and in mixed paints. In oil it discolors less than red lead. In strength it about equals red lead.

Manganese Oxide—This valuable drier is obtained from nature direct and from the still liquors resulting from the manufacture of chlorine. The first is the mineral manganese or pyrolusite, which is pulverized in water and then dried. Manganese dioxide, the chemist calls this black oxide. The compounds of the metals with oxygen, with the exception of those which have decidedly acid properties, are called oxides. When a metal unites with oxygen in several different proportions, forming different oxides, these are distinguished by certain chemical terms, as protoxide, deutoxide, binoxide, tritoxide, peroxide. The latter, for instance, represents the highest oxide, the others representing first, second, third, etc., oxides. An oxide containing three atoms of oxygen to two atoms of metal is called a sesquioxide. Compounds of non-metallic substances with oxygen, which do not possess acid properties are also called oxides. Thus there are oxides of nitrogen and phosphorus. The lower oxides are generally strong bases, while the higher oxides exhibit basic or acid properties according to circumstances. Oxides may be formed directly from metals by union with oxygen, as in red lead making, or indirectly, by separating them from some salts which contain them, as oxide of copper, for instance, is produced by precipitation from the nitrate, through the agency of potash.

Hydrochloric acid dissolves manganese dioxide, forming manganese chloride. With sulphuric acid it dissolves and forms manganese sulphate. It is really a peroxide, as it contains a very large volume of oxygen, more, indeed, than an equivalent for the metal. This gives it its peculiar and valuable character as a drier, making it the most powerful of all the drier substances. One-fourth of a pound is sufficient to dry 100 lbs. of oil. Its very strength makes it an unsafe drier in the hands of the painter, who is apt to use too much. It also greatly darkens oil with which it is boiled, and gives a dark liquid drier.

Manganese Sulphate—This is formed by the dissolving action of sulphuric acid on manganese. The solution is evaporated, leaving a mass of faint pink crystals, with some water in their composition. It must be dried well before using as a drier. It does not disco or oil, as manganese oxide does, than which it is somewhat less powerful as a drier. A little less than ½ lb. is enough for 100 lbs. of oil or paint. It is a more powerful drier than the lead compounds, but its containing some moisture is against its use.

Manganese Borate—Adding a solution of borax to sulphate or acetate of manganese gives a faint pinkish powder, which is washed and dried for use. It is the most powerful of the driers though it contains less oxygen than the black oxide (the proportions being about 25 per cent. to about 37 per cent.) It does not discolor oil. Between ¼ and ½ lb. will dry 100 lbs. of oil.

Manganese Oxalate—A writer in a French journal drew attention to the properties possessed by manganese oxalate as a drier. He said that this salt had hitherto no important industrial uses. It is readily prepared in a state of purity from the native or manganese hydroxide carbonate by the action of oxalic acid. Or it may be prepared by precipitating manganese salts with oxalate of soda or potash. Heat resolves the manganese oxalate into manganese oxide, carbonic acid, and carbon monoxide, and, in the presence of fatty acids, the manganese oxide formed combines with them, decomposition taking place at about 130 degrees. The operation is conducted by mixing in a mortar the oxalate with two or three times its weight of oil, and then adding the mixture to the main portion of oil. Heat should be applied gradually, and decomposition is known to be complete when evolution of gas ceases. The boiled oil prepared under this treatment preserves its limpidity and color. The oil also remains transparent when exposed to sulphur vapors—an advantage in favor of the oxalate. Oxide of lead,

and manganese acetate also, discolor oil, while the nitrate is unsafe to use owing to the possible action of nitric acids on the fats present in the oil. Manganese borate is perhaps the next in value to oxalate as a drier, both possessing nearly the same drying power.

Zinc Oxide—This is not a drier at all, but is employed sometimes in making driers, to weaken the too strong drying properties of other ingredients.

Zinc Sulphate—This is sometimes used as a drier, but its value in this capacity is extremely small, not to say doubtful. It forms a part of several "patent" paste driers, in conjunction with sugar of lead and drying oil, and is useful in effecting a light colored compound for adding to white paint, to facilitate the drying process.

Ferrous Sulphate—Sulphate of iron, copperas, or green vitriol, readily absorbs oxygen from the air and turns brown from the accumulation of peroxide of iron upon its surface. It is of a pale blue-green, and these dissolve readily in water. Ferrous sulphate is easily decomposed, moist air effecting its oxidation, changing it from its original state to ferric oxide. It dries too hard, and hence is not a safe siccative. Between one and two pounds of this drier are required to dry 100 lbs. of oil.

From some of the substances enumerated in the foregoing list, each of the many siccatives in use are prepared. These may be classified under four heads, namely: zinc or patent drier, japan drier, brown japan, japan gold size, liquid driers, litharge and red lead.

As a drier, red lead is second to none other, and it should be used wherever possible. Hardly any pigment used by the house painter is affected by it, artificial ultramarine being about the only one, and although sulphur gas affects it, the discoloration will show only in white or very light work. It should, however, be made thoroughly dry before using, and pulverized very finely. Adding the lead to manganese driers is the best way to use it. The English director general of stores at the India Office suggests that when driers are required for ordinary paints, litharge should be asked for instead of "patent driers ground in oil, they being of uncertain composition." He gave the present cost of patent driers at $3.13 per 100 lbs., and that of litharge at about $4.00, but that in drying effect 50 lbs. of litharge would be equal to about 100 lbs. of the driers. So that the litharge would prove the cheaper by about a third in price. For dark paints, and always for floor, deck, etc., paints, litharge may be used. Add a small portion of the litharge (in paste) to a small portion of the paint, and beat up together, then add to the body of the paint.

Japan drier usually contains shellac. It is composed of manganese or lead, and sometimes of both. Here are the formulae for two japan driers: Linseed oil, 5 gals.; red lead, 3½ lbs.; litharge, 3½ lbs.; raw umber, 1¼ lbs.; sugar of lead, ¾ lb. Pulverize and mix the ingredients together, add to the oil, then boil gently over a steady fire two or three hours. Remove the kettle, and, when the oil has cooled down to a certain degree, add 5 gals. turpentine. Stir the mixture thoroughly and let stand a half day; then pour off carefully and put into cans for use.

Into one gallon linseed oil put ¾ lb. gum shellac, ½ lb. litharge, ½ lb. burnt umber, ½ lb. red lead and 6 oz. sugar of lead. Boil together for four hours or until all the ingredients are disolved. Remove from the fire, and add 1 gal. turpentine.

Colors ground in Japan are not suitable for making delicate tints or shades. With japan, flake white will give a creamy color. A sparing use of japan is, therefore, advisable in such cases. But japan is the drier for making quick putty.

There are various tests for japan. Mix some of it with oil; if it curdles the oil, it is not good. Grind some of it with turps and dry color and spread some of the mixture upon a hard surface; examine with a magnifying glass two days later, and, if full of fine cracks, it is not good; too much shellac. If no cracks are visible, give it a coat of best rubbing varnish; if this acts wrong, the japan is bad. If paint to which japan has been added, dries with a "tack," the japan is very poor. Grind some drop black in japan and thin up with turps to a proper or usual consistency. Apply a coat of this to some fit surface. Let stand twelve hours in a warm place. Give another coat on top of it, and if the first coat works up under a soft brush, the japan lacks in binding qualities. Spread a coat of paint containing japan on a piece of glass. Let dry; then hold up to the sunlight, or before a lamp in a dark room (the best plan), and if the paint is full of fine cracks, the japan is not good. This is a crucial test. If the japan will dry lampblack (ground in oil) in a reasonable time, it is good, so far as its drying property is concerned.

The smell of a drier is sometimes depended upon to determine its character, but this is a very crude test. Driers made from the same ingredients may vary in odor, and yet possess like properties and efficiency.

Japan gold size is lighter in color than brown japan drier, and nearly twice as powerful. It is especially useful for light colored paint, and is much favored by carriage painters. It is an oil-drier and less injurious to paint than the ordinary japan. A good test for gold size japan is to rub a little of it between the thumb and finger, which will reveal whether it is "sticky" or not; if it is, then it possesses good binding qualities. Test it for drying, etc., by the methods already given. The lighter in color the gold size japan is, the more desirable it is.

The following specifications for japan, issued by the Pennsylvania R. R. Co. are valuable to the painter, as they cover the ground thoroughly:

1. It must be limpid enough to deliver a good stream through a pipette with lower aperture one-sixteenth of an inch in diameter, at a temperature not above 80 deg. Fahr.

2. It must not contain over 50 per cent. by weight of turpentine, and no benzine or other petroleum products.

3. It must give a clear solution when mixed 1 part of japan with 9 parts of gasoline (gravity 88 deg. Baume) by volume. Pour the japan into the gasoline.

4. It must give a clear solution when mixed 1 part japan with 9 parts of a mixture of 3 parts oil and 2 parts turpentine by volume.

5. It must pass a drying test conducted as follows: Make a thorough mixture of pure raw linseed oil and the japan, 9 parts oil to 1 part japan, by volume. Spread this mixture at once by means of a clean brush, on a non-absorbent surface—ferrotype plate previously cleaned and dried is best; leave on the plate not less than one-fifth of a grain per square inch. Now expose the plate to a temperature of 120 deg. Fahr. for two hours—best in a drying oven fitted to give a slow change of air. Take the plate out, lay it flat, and allow it to cool. As soon as the plate is cool, place three or four No. 2 shot near one edge, then raise this edge until the plate is vertical. If the material is dry, the shot will roll off freely; if not, they will stick or roll down slowly, carrying some of the material with them. Shipments of japan will not be accepted if, when tested as above, the shot adhere to or in any way break the surface of the layer.

With such specifications as these a buyer runs little risk. Field says that "it would be well if lead and copper could be banished from our list of siccatives altogether. He adds that "the best of pigments may be ruined by their injudicious use and obtain a character for fugacity, which they may in no way deserve." He is addressing himself to artists, but his caution is useful to house and carriage painters also. The lead siccatives should be used carefully, and with only those pigments not liable to be injured by them (genuine vermilion, artificial ultramarine, cadmium yellow, Naples yellow, the lakes, etc.) Even with white paint they are not the best, excepting, perhaps, lead acetate in small quantity. Verdigris is very poisonous, and should not be used. Sugar of lead, or lead acetate, is condemned by many painters, but there are testimonials in its behalf showing that it is desirable in slow-drying colors like madder lake and the blacks. The small amount necessary in drying paint would scarcely exert any injury. Much is said

concerning its presence in white lead as it comes from the factory, and the coarse, granular postules sometimes seen in white lead are said to be due to the presence of this acetic acid, but, if so, it is scarcely likely that it exists in sufficient quantity to affect the paint after the large quantity of oil necessary has been added to it. It is also thought that this acid causes white lead to be transparent and lacking in covering power. But these are all surmises without sufficient proofs behind them to merit credence.

The best drier is a compound of bases having the property of several oxides and series of salts. For zinc white, manganese and zinc sulphate are the best driers. A formula for a zinc drier is thus given: Six and one-half pounds dry manganese sulphate; 6½ lbs. dry manganese acetate; 6½ lbs. dry zinc sulphate; 980 lbs. dry zinc white, all ground together. From two to three per cent. of this is usually added to the paint. The manganese salts only act as driers; the other materials are really dilutents, and of themselves can exert no drying action.

Another drier for white paint is obtained by mixing one pound each of sulphate of zinc and acetate of lead with two pounds pure white lead (carbonate).

Hurst gives us the composition of "patent driers" in a common form, as follows: Take 15 lbs. dried zinc sulphate, 4 lbs. lead acetate and 7 lbs. litharge; mix them with 4 lbs. boiled oil and grind well together. Mix 100 lbs. Paris white and 50 lbs. white lead with 30 lbs. boiled oil; grind and then mix with the first mixture, adding sufficient boiled oil to give the mass the consistency of soft dough. The same author also gives a formula for "Zumatic drier," which calls for zinc white, 25 lbs.; managnese borate, 1 lb. These are ground together. "The object of the zinc white is simply to dilute the manganese salt, and to form a powerful drier in a convenient form. The proportions generally used are 1 lb. drier to 25 lbs. paint."

Here is the way an old painter makes liquid drier. For many years he used either sugar of lead or litharge as driers; and many a weary hour he spent as an apprentice grinding these stuffs with a muller and flag. Later on he heard of zinc drier and used it successfully, both with zinc and lead paint. Learning that it was made from manganese, he made it himself, and for many years used no other driers for all colors. He found it the best every way, and in all sorts of weather drying hard and elastic also. He found that it succeeded very well when made after the following formula: To 1 gal. of raw oil add ¼ lb. of black oxide of manganese, and boil slowly for at least five hours in an iron pot. The more boiling, short of burning the oil, the better. When cold and precipitated, draw off the liquid and add half as much turps as there is drier. In a day or two you have a drier you may swear by. He used to make ten gallons at a time in the open air, but has been able to get his oil prepared with manganese drier and called "pale boiled," which he now uses for everything.

A "cheap japan drier" is described as follows: Mix together 4 gals. pure linseed oil, 4 lbs. each litharge and red lead, and 2 lbs. raw umber, in powder. Boil slowly for two hours, add by degrees 7½ lbs. shellac, and boil one-half hour longer; when well mixed, add by degrees one pound powdered sulphate of zinc, and when nearly cold mix in thoroughly 7 gals. turpentine.

The number of driers on the market is large, and each manufacturer puts out several lines. Price is a fair criterion, but not advised as a rule. Test the drier, and use it properly, not ignorantly.

ABOUT PAINTING MATERIALS

The development in the use of prepared paint has been a gradual process. It is of interest to think back to a period of fifty or sixty years ago, when users of paint, both decorators and coach builders, made up their own paints from dry pigments. In these earlier years dry colors almost entirely were sold to the user, and he laboriously ground them with a stone and muller to varying conditions of fineness, in accordance with the amount of labor he put into the task. This grinding of colors was one of the jobs apprentices were called upon to do, particularly in the slack seasons. It had the advantage of making the workman acquainted with the character of each individual color he used.

The first development from this old method, according to a speaker before the Polytechnic in London, took place about the year 1870, when color makers began to grind colors on granite mills, and to offer them in the form of paste paints. Much opposition was shown on the part of the old-fashioned members of the trade to this innovation. Notwithstanding, the more progressive and enlightened members of the painting trade recognized that colors ready ground were of value. They did away with the laborious hand grinding, which was unproductive, and gave to the craftsman goods finer in texture at a much lower cost.

About forty years ago a man named Samuel Eyles, of Worcester, had the brilliant inspiration to put up a ready-mixed paint for home use. This was, I believe, the first prepared paint.

Their Economy

The old rule-of-thumb method involved a great deal of waste of time and material. Then the waste of materials in many paint shops, and on the jobs, is enormous.

Prepared paint, on the other hand, comes to the job in sealed tins. They have been skillfully combined by special machinery, and are practically ready for use. Their purity and fine grinding give them greater covering capacity than the less skillfully mixed paint made by hand. The operator stirs his paint thoroughly, lifting the pigment from the bottom to the top, so as to thoroughly mix all the ingredients. He takes as much as he is likely to want from the tin into his paint pot, and closes up the remainder, so that there is no skinning and little waste.

In considering the economy of prepared paints with hand-mixed paints we must, then, remember the following points:

First—Hand-mixed.—The ingredients used may not be as pure, or tested in the same way as for prepared paints. The mixing cannot be so thorough, or the resulting coat so fine. The covering capacity per gallon is less. The waste of materials and of time in the paint shop is great.

Second—Prepared Paints.—All ingredients tested by the manufacturer. Shades standardized and each batch is correct to standard. Every one being thoroughly incorporated and combined, gives finer coats. The spreading capacity is greater, and the finer particles lie closer. There is practically no waste.

Life, or Wearing Capacity, of the Paint

Let us now consider wearing capacity, or life, as compared with hand-mixed paints. It is, I think, common sense to conclude that the better made article will last longer than the poorly made one. I speak, of course, of the high grade paints made by reliable firms. One great reason for the greater wearing capacity of the prepared oil paint is the purity of the linseed oil use. Now, it is an accepted fact that the medium used is what determines the life of the paint. The oil is the protective coating, and when the oil is done the paint crumbles. A second reason is that the methods of manufacture give us a perfect system of combining the various ingredients—lead, zinc, and coloring matter, with the necessary liquid—into a perfectly mixed paste. These perfect methods of manufacture are clean and economical. There is no handling of the material from the time the dry ingredients are placed in the first mixer, or pug mill, until it is run off into the tin ready to be labeled and despatched. Our arrangements utilize the law of gravitation, so that we start operations on the top floor, and finish off on the ground floor.

The life of any paint, of course, depends on various factors. In the first place, if it is new work, the priming coat or coats must be of the best materials—good pigments and good linseed oil. The quantity of oil used will, of course, depend on the character of the wood—whether a soft or hard wood. In the

second place, life, or wearing capacity, depends on the under coat work being of suitable character, fine in texture, and each being allowed sufficient time to dry hard before the next is put on. Third, the character of the final coat. Here we want greater elasticity, so as to enable it to stand the changes of temperature without cracking. The fineness or smoothness of the finish is of great importance, for you can readily understand that a smooth surface offers little or no resting place for water or sulphur particles to rest and attack the paint. On the other hand, an unequal surface or rough surface permits lodgment of these, with consequent quicker disintegration of the skin.

To use a rough illustration of what I mean, if you examine some coats of paint under a microscope you may detect little excrescences. As oil, like water, finds its own level, the tops of these excrescences are not well covered and protected, as are the smooth valleys, so to speak. Just as the grass is very thin on the hilltops and thick in the valleys, so the linseed oil or varnish, or whatever medium is used, is thin on the top or outside of the little excrescences, and thick in between, in the minute crevices or alleys. A paint is attacked at its weakest point, and any roughness in the coat is a weak spot. You will thus see the necessity for smoothness of finish if the maximum of life is to result. We claim that high grade prepared paints, being ground perfectly and mixed so thoroughly, give this smoother surface, and in consequence, if the ingredients are of the best, they must last much longer than hand-mixed paints, which probably do not possess such extreme fineness.

Another point we must not overlook in connection with the life of colored paints, viz., the quality and character of the pigments used to give the necessary tint or color in the finishing coat. Most manufacturers of high grade prepared paints use for tinting their colored paints the strongest and purest pigments. They do this advisedly, for they know that to do so is true economy. Less is required to give the desired tint, and the resulting tint is purer in tone than it would be if a weaker color were used. Not only so, but such strong colors keep their tone and beauty longer than pigments of lower grade.

Now let us give a little consideration to the varieties of prepared paints. These may be good or bad, efficient or non-efficient for the purpose of protection and beautifying. I want you to understand that high grade prepared paints cannot be as low in cast as low grade hand-made paints made from impure and poor materials. Competition between the best manufacturers makes it impossible for any one of them to make too great a profit. The cost of prepared paints must bear some analogy to the cost of hand-mixed paints of high grade, and I assert they do.

PAINT SHOP HINTS

Soft water is best for paint shop use, and if a hogshead or large, well made barrel is placed in the shops so that rain water may be run into it, thus avoiding freezing in winter and dust and dirt in summer, one need never be without the best obtainable article of soft water.

A carpet sweeper having been recommended for the paint shop, it may be noted that it as well as the broom will raise a dust, and hence the floor should be slightly sprinkled before sweeping in either case. The carpet sweeper is in use in some shops.

Another household article found useful in the paint shop is the clothes wringer. For wringing out chamois skins it is just the thing, saving time and likewise wear and tear, besides avoiding lint, which comes from pulling fibres from the skin in hand wringing. The wringer would last an age with care.

To remove specks of dust, etc., from a varnished panel, it is recommended that a piece of whalebone be whittled to a fine point, then chewed to form a bristle-like end, with which the specks may be carefully removed, just after the varnish has set or begun to set.

On hurried work, where there is danger of the striping rubbing up under the varnish brush, go over the stripes first with a pencil dipped in clear japan. This will soon dry, and the job may be proceeded with without loss of time.

One of the best disinfectants is turpentine, but copperas dissolved in water is nearly as good and is much cheaper and less dangerous to use. Sprinkle it daily over the floor of the foul smelling paint shop. It is non-poisonous, except when taken inwardly, and is very healing to sores, etc.

When sprinkling a floor before sweeping don't use too much water, as it makes clean sweeping impossible, forming mud spots that dry and become dust again.

Keep the paint shop walls clean by not wiping out the brush upon them. Have a can and a blunt knife, wipe the brush against the knife's edge, into the pot.

It is advised to lay off each coat of paint and color in an opposite direction, so that the finish will show up no brush marks in longitudinal ridges; the criss-cross effect is of evenness and solidity.

For mixing paint oval sticks are better than flat or any other shape, as they press the sides of the can better, and hence enable one to press out color lumps more readily.

A galvanized bucket and cover for greasy rags, etc., will perhaps please the insurance agent. Try it.

A small blow pipe for getting dust out of corners supplements the duster nicely. Get the tinner to make you a tube like boys blow putty balls from. A small hand bellows is also good, especially where one's wind is not sufficient for a blow pipe.

SOMETHING ABOUT TURPENTINE

American turpentine is manufactured from the oleoresins obtained from the resin of Pinus Australis and Pinus tæda. Preparations for collecting the resin are made in the winter time. In order to obtain the resin the trees are boxed; that is, a hole is cut into the side of the tree about a foot or eighteen inches from the ground. In some cases from two to three boxes may be cut in one tree. Care should be taken not to cut too far into the tree, otherwise it will be killed. The sap commences to flow about March and the resin to collect in the boxes. As the resin hardens on the sides of the cut and the upper part of the box, it is scraped away to expose a clean surface. The portion which collects in the box is called the "dip," and that taken from the sides the "scrape." The crude resin is to a certain extent exported for the manufacture of varnishes, but the bulk of it is distilled for making turpentine. A great portion is distilled in a more or less crude manner in the neighborhoods in which it is collected. This is the chief cause of the variations in the quality of the turpentine produced.

The boxing method of collecting resin is very crude, and in a short time results in the death of the trees. Not only are the trees killed, but the yield of resin is less than when cuts are made through the bark, and the resin is collected in cups.

The boxing method is now being superseded by the French method of facing; but even in this case a very much larger surface is exposed than is the case in France. In order to expose a large surface right and left-hand negroes are employed, so that one negro cuts the right side and the other the left.

Generally speaking, in the American processes the trees are killed within four or five years, and are then used for lumber. This in itself would not matter if, after felling and clearing, new pines were planted.

In some parts of Florida fresh forests have sprung up from self-seeding. In many cases, however, this has been prevented owing to the fact that pigs were turned loose into the forests, and the pig loves the tender tops of the seedling pines.

French turpentine is generally more homogeneous in constitution, owing to better methods of collecting the oleoresins and better distillation methods employed. The trees are cut in February or March, and the sap is collected in earthenware

vessels. The trees are bled for many years in succession because the method of facing does not kill them. As a consequence it is possible to bleed trees for 40 years, or even more, without killing the tree. When the tree dies it is felled, and a new one planted to replace it. Time does not permit me to go into the process of distillation adopted in France, and it must suffice to say that it is mainly a steam distillation process.

It would be of great interest to hear the views of varnish manufacturers and paint mixers as to the use of "genuine substitutes," if I may use the expression. At one time no varnish maker would touch anything except genuine American turpentine: but now I understand that substitutes containing only sufficient American turpentine to give them the smell are largely employed. It was supposed that any kind of petroleum oil would cause a "bloom," but we know that enormous quantities of white spirit are used in turpentine substitutes. In fact, large quantities of pure white spirit, without the addition of turpentine, are now sold. I may be wrong, but I rather imagine that the bloom was produced by mixing high boiling petroleum oils with the varnishes, as I certainly should expect a bloom to be produced in such cases.

Benzine and some of the lower homologues of benzene, such as toluene and xylene and solvent naphtha, are also used in the production of turpentine substitutes. Frequently small quantities of essential oils are added to improve the smell. One would hardly have thought there was as much value in patenting a substitute, but here is one I recently came across. Purified paraffin is heated to 100 deg. F. and naphthalene is dissolved in it. The solution is then cooled to about 90 deg., and a readily oxidizable oil such as eucalyptus added. In order to obtain a superior product the liquid is further treated with naphthalene, thinned at boiling point with methylated spirit and mixed with twice its volume of white spirit, and about its own volume of benzoline previously rendered non-inflammable. This is a funny substitute, but I wonder how the benzoline was rendered non-inflammable.

Here are a few more substitutes: (1) Russian pine oil, 100 parts, solvent naphtha 100 parts, petroleum 100, citronella oil 1 part; (2) Russian pine oil 150 parts, petroleum 200, citronella oil 1 part; (3) rectified resin spirit 50 parts, solvent naphtha 150, petroleum 50 parts, citronella oil 1.25 parts; (4) Russian pine oil 50 parts, solvent naphtha 100 parts, petroleum 100 parts, caraway oil 1 part; (5) Russian pine oil 100 parts, rectified resin spirit 100, benzine 100, petroleum 100, citronella oil 1.25; (6) Russian pine oil 100 parts, benzine 200, petroleum 100, caraway oil 1.25 parts.

It is not very difficult to detect mineral oils or coal tar oils when mixed with turpentine, but it is often a difficult matter to detect a mixture of Russian turpentine with American, unless the proportion is large, or of wood spirit and turpentine.

The tests which are most generally employed are specific gravity, distillation, refractive index, flash point, and iodine value.—A. J. Walbrook.

GRAINING TO REPRESENT ROSEWOOD

It requires special study and attention if a fair imitation is to be made. Its grains and figures are in some respects different from those of any other wood.

There is a main trunk heart grain, but it seems to often interlock with a multitude of secondary grains interspersed with dark veins of greater or less diameter, but always showing one clean-cut edge.

Ground color—Orange chrome, red lead, white lead.

Graining color—Vandyke brown, rose pink, drop black.

Tools—Sponge, rubbing in brush, sash tools, fitches, mottler, overgrainers, camel's hair pencil, black crayon.

The graining colors are vandyke brown, rose pink, ivory or drop black. The base of the color is vandyke brown and the other colors are blended into the work. After sand-papering the ground color and dusting off clean, the work should be sponged over with a little of the thin rubbing-in color. If the color creeps or crawls, use a little bolted whiting on the sponge.

The thinners for the graining color should be one part stale beer or vinegar to two parts of clean water. When a panel is rubbed in with the graining color the sponge can be used to remove portions of the color. These places will be the lightest in color on the finished work. The rose pink may be used in a sash tool and proportions of that color blended into the vandyke brown. Later, the edges of these proportions may be sharpened with a small fitch tool charged with some of the thin black. The blender is used to sharpen the edges of the black veins. After the general plan of light and shade is determined, the work is allowed to dry and the grains are finished by using the over-grainer. This is a little flat brush the bristles of which are charged with thin color, which is made by mixing vandyke brown and a little black.

The bristles of the overgrainer are separated with a bone comb and the grains put in with a quick touch, blending immediately with the badger blender.

THE WEIGHT OF BARYTES

When barytes is taken from the earth in the shape of the rock known as "heavy spar" it is very heavy. But when it has been treated and ground ready for mixing into paint it is considerably lighter than pure white lead. The specific gravity of barytes is 4.401, precipitated or artificial barytes 4.144, zinc oxide 5.470, lithopone 4.236, white lead (stack process) 6.750, white lead "quick process 6.568. Of course, these figures refer in each case to the dry material, and there would be a difference when ground in oil to form a paste, but enough has been said to show that the popular notion that barytes is very heavy is entirely an error.

GOOD PUTTY PRACTICE

A great deal of the bad work charged up to poor puttying belongs to poor putty making. It used to be an ironclad rule in the carriage paint shop to mix all putty thoroughly, working the white lead and the whiting so intimately together that the composition of the two pigments become one and the same thing.

When the mixture of putty composed in part of dry white lead and whiting is imperfect, as under the present stress of things it so often is, and the dry whiting becomes scattered in minute particles throughout the mass, trouble is certain to ensue. The putty driven into and plastered over the surface defects will show dry and hard so far as the carefully mixed lead and whiting is concerned, but the unkneaded dry particles of whiting under the water rubbing will wash out, leaving a defective and punctured patch, and under the sandpapering process it will tear out, leaving a similar result. In either case it will prove a "bad job" and necessitate reputtying and perhaps delay in the work. When the putty is properly kneaded and worked until it can be handled with the bare hands without sticking, and feels smooth and fine in the hands, it should, other things being equal, prove a good article.

In the actual work of puttying we like to use the pigment directly from the hand, carrying a small ball of it in the left hand, and working out from the ball a capsule about large enough to fit into each individual crack or crevice.

SHELLAC AND PARA RUBBER SOLVENTS

There is no satisfactory solvent common to both shellac and para rubber or caoutchouc. Shellac may be dissolved in alcohol, oil of turpentine, benzin or naphtha. Caoutchouc is insoluble in water; absolute alcohol pentrates it without dissolving it, while ether dissolves 1 per cent. of it, the non-dissolved portion swelling up very much. Drying oils do not dissolve it, but non-drying oils dissolve considerable quantities with the assistance of heat, the qualities of the caoutchouc, however, thereby suffering injury. Oil of caoutchouc is an excellent

solvent, as also are oil of turpentine containing 3 to 5 per cent. of sulphur, chloroform, benzol and carbon disulphide. A mixture of 100 parts of carbon disulphide and 6 to 8 parts of absolute alcohol gives a solvent which, after evaporation, leaves the caoutchouc in an unchanged condition. The principal reason why solutions of caoutchouc very frequently prove a failure is due to the diffculty of obtaining a material entirely free from water. Caoutchouc, on account of its impermeability to water, tenaciously retains moisture in its pores which cannot be removed even by long heating. To overcome this as much as possible it is best, before working the material, to cut in thin slices and dry them at from 105 to 122 deg. F. for several days. The material thus prepared is less indifferent towards solvents, and solution is more easily effected.

ELASTIC VARNISHES

Some formulas for elastic or flexible varnishes, thus trade named, are:

(1) India rubber, cut small, 1½ ounce; chloroform, ether (washed), or bisulphide of carbon, 1 pint; digest in the cold until solution is complete. Dries as soon as laid on. Pure gutta-percha may be substituted for india rubber.

(2) India rubber, in shavings, 1 ounce; rectified mineral naphtha or benzol, 1 pint; digest at a gentle heat in a closed vessel and strain. Dries very badly, and never gets perfectly hard.

(3) India rubber, 1 ounce; drying oil, 1 quart; dissolve by heat. Very tough; dries in about 48 hours.

(4) A caoutchouc varnish for gilders may be made by dissolving 1 part by weight of cauotchouc in 8 parts by weight of petroleum free from water and mixing the solution thus prepared with 4 parts by weight of copal varnish (Brannt).

LABEL VARNISH

Label varnishes are needed and used by manufacturers, and some of the following may be found more satisfactory than some now in use.

(1) A very satisfactory varnish is made with equal parts of Canada balsam and turpentine. The labels should first receive a thin coating of mucilage, which must be dried before the varnish is applied.

(2) Label Varnish That Does Not Penetrate Paper.—The following varnish does not penetrate the paper in the least: Dissolve 20 parts of dammar in 180 parts of acetone, and to the solution add 150 parts of clear collodion solution. Apply with a soft brush.

(3) Sandarac, 53 parts; mastic, 20 parts; camphor, 1 part; oil of lavender, 8 parts; venice turpentine, 4 parts; ether, 6 parts; alcohol, 40 parts. Macerate for several weeks, agitating frequently until dissolved, and decant or strain from the impurities. The varnish dries rapidly to a colorless, smooth and glossy layer.

(4) African copal, 60 grams; powdered glass, 60 grams; camphor, 15 grams; ether, 250 grams; absolute alcohol, 60 grams. Reduce the copal to fine powder, and mix the glass with it; place both in a 500-gram bottle with camphor and the ether, close well and set aside for a month, shaking occasionally. At the end of this time add the alcohol and, after shaking well set aside for fourteen days; then pour off the clear portion of the varnish. Before using this varnish it is advisable to size the paper surface with a solution of isinglass in spirit, 1 part, water, 3 parts.

NEW OFFICE

The Standard Roller Bearing Co., of Philadelphia, announces an office has been opened in Indianapolis, in charge of L. M. Watkin, Jr., the office being located in Room 1201, State Life Building.

On account of the rapidly increasing demand for their annular ball bearings, taper roller bearings, ball thrust bearings, roller thrust bearings, and steel, brass and bronze balls, for equipping automobiles, motor trucks, and machine tools of all kinds, and for ball bearing hanger boxes which are used to modernize the line shafting equipment in various industrial plants, it was found necessary to divide up the territory formerly covered by the Chicago office and open this office in Indianapolis.

FLOOD NEWS FROM INDIANAPOLIS

With Indianapolis slowly recovering from a devasting flood of several days the people are realizing that the automobile industry of the Hoosier Capital proved the means of saving many lives. Three of the Indianapolis factories were submerged in the flood that followed the breaking of a levee in West Indianapolis, namely: Marion Motor Car Co., Motor Car Manufacturing Co., and Nordyke Marmon Co. Another factory closely allied with the automobile industry to suffer was R. J. Irvin Body Co., which was also submerged.

When the flood started to creep over the banks of Fall Creek in the residential section of the city all the test cars from every factory began bringing people to high ground through the flooded streets. This was followed by the crippling of the street car service and factories donated cars and trucks for transportation of people to their homes. Nearly every available truck in the city was detailed to the service of the police department and hauled boats to the flooded district.

With the breaking of the levee every touring car that was available was put in service under the direction of the Red Cross society and carried people to the hospitals and relief stations, as there were not enough ambulances to take care of one-tenth of the flood sufferers. Test cars from the Cole, Henderson, National, Stutz, Premier, Marion, Pathfinder, and Marmon plants drove through the flooded streets sometimes with water over the floor boards carrying people to safety.

C. P. Henderson, president of the Henderson Motor Car Co., closed down the factory to assist the flood sufferers and put every man that could drive at the wheel of a car to assist in the work. The Henderson plant escaped damage, although the water rose to within fifty feet of the plant. "Old Bolivar," the first Henderson car built, was placed at the disposal of Superintendent of Police Hyland.

The automobile show was closed on Tuesday, after being open one day, but the people of Indianapolis saw a better show in the utility of the automobile. The show was opened Sunday afternoon and evening, March 30, and every dollar that was given at the gate was turned over to the flood sufferers as it was a free-will offering without any definite charge being made for admission.

Owing to the crippling of transportation facilities it was up to the automobile factories and dealers to take food to the flood sufferers. Some of the unfortunates had been in their homes for 48 hours without food or drink when they were finally rescued. Such men as R. P. Henderson, of the Henderson Company; W. C. Teasdale, of the Pathfinder; J. I. Handley and W. McK. White, of the Marion; Jas. L. Gavin, president, and W. S. Gilbreath, secretary of the Hoosier Motor Club, all used their own cars and helped to feed the famished that were brought to the administration building of the Marion Company, the second floor of which was high and dry. The boats brought them to the Marion plant and they were then sent across the Oliver avenue bridge to the waiting motor cars.

Indianapolis is taking care of its own losses in a forceful manner and outside aid will not be necessary. The automobile factories that suffered began work as soon as the water had subsided on Friday and are now running full forces day and night.

Automobile Department

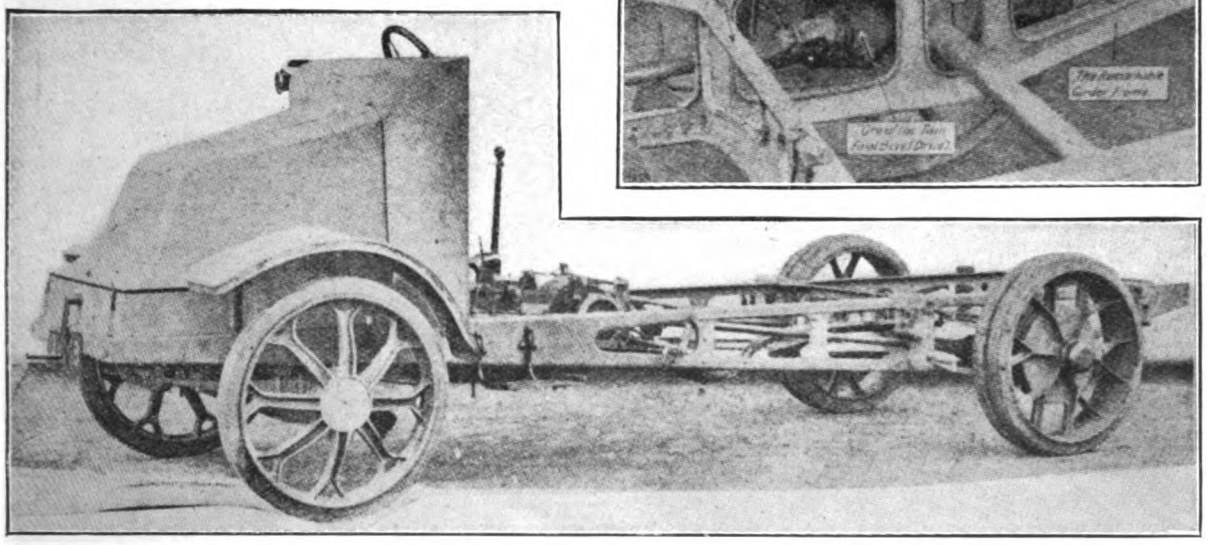
A COMMERCIAL OF NEW DESIGN

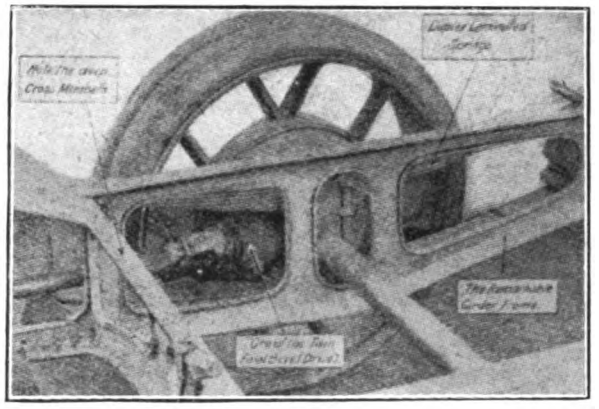
The illustration is to show part of the frame member and spring suspension of a new commercial truck just on the market in England. The Commercial Motor tells much about it, but we just mention some of the unusual features.

The dominant feature is the lowness of the frame line, and much of the whole conception is directly traceable to a desire to preserve a low loading platform. The frame work consists of open girder-work construction, and this is suspended, respectively, on the front and back axles by novel arrangements of the springs. At the front we find that long semi-elliptic springs of normal type are located within the frame line, in order, we find, to ensure a quite unusual degree of lock for the front pivoted wheels. The front springs are anchored at their forward ends.

At the rear of the frame an entirely new method of suspension is adopted. Two springs are used on each side of the rear axle; one of each pair is placed above it and the other below, and it is claimed by the constructor that this arrangement efficiently provides for the transmission of either propelling or braking effort without imposing lateral bending action upon them.

A feature of the wheel design is the absence of protruding





hub, a characteristic which will be appreciated by those who have not heistated to launch criticisms in this respect at some of the models which are much in use today. A considerable proportion of the collisions in thick traffic are due to the striking of protruding hub caps. All four road wheels are of cast steel, and the front one is riveted on to a flanged spindle of case hardened nickel steel, which runs in phosphor bronze bushes carried in the swivel heads. The rear wheels are bushed and run on the axle tube, which is especially ground for the purpose.

The most novel feature is the arrangement by which the drive is transmitted from the rear part of the gearbox, which portion houses the differential gear, to the hind driving wheels. Each wheel is driven independently by means of a universally-jointed propeller shaft, and at each end of each shaft an enclosed bevel gear is mounted. This unusual arrangement has been decided upon primarily in order to arrive at a suitable combination of the relative advantages of the side-chain drive and of the worm or bevel live-axle drive. It is claimed that this method yields the same clearance beneath the rear axle which is available with side-chain drives, and it preserves, at the same time the principal mechanical advantages which accrue from the employment of one or other of the better known forms of live axle. There is no central casing, of course, to detract from the ground clearance, and what disadvantages there may be to chain drive are not present.

WORM GEAR

F. W. Lanchester, M.I.C.E., speaking of the worm gear before the British Institution of Automobile Engineers, said:

The main interest that attaches to worm gear from the point of view of the automobile engineer is its application to the rear axle transmission of a motor car. Worm gear and screw gear, it is true, are applied to some small extent to accessory purposes, such, for example, as the driving of the valve gear or the magneto of the engine, or the steering motion transmission on the chassis, but these are applications of quite secondary importance.

Power transmitting worm gear for motor car use requires to comply with two main conditions: (1) It must give an efficiency comparable, if not equal or superior, to the efficiency of the alternative types of gear, i. e., bevel or chain; (2) it must be of approximately similar weight and size to a bevel gear of equal horsepower capacity. It is unnecessary to mention silence as a third condition, since this is the point on which worm gear is notoriously beyond reproach.

Compared to other forms of gearing on the score of efficiency, modern worm gear is well able to hold its own. On the score of weight and compactness, the Lanchester worm gear does not compare unfavorably with bevel gear; the size

and weight of a rear axle for a given duty is approximately the same for both types of gear.

The maximum load that can be transmitted by any gear pair depends mainly upon the type of worm or screw gear employed. It depends, in fact, upon what tooth pressure the gear will stand without expelling the lubricant from between the engaged surfaces.

There is some confusion as to terms in connection with worm gear. The term itself generally accepted in this country is possibly a misnomer. Alternative terms sometimes used are screw gear, skew gear, helical gear, etc. In the present paper the term screw gear is used to denote gear in which the teeth of the two component elements are true parallel screws; the term parallel worm gear to denote worm gear in which one element only (the smaller element) is a true parallel screw, and in which the wheel is of the hollowed-face form; and hollow worm gear for the type in which both elements have hollowed faces—that is, the type commonly known as Hindley gear. There is a fourth type, in which the wheel is a true screw gearing into a hollow-faced worm.

One of the obstacles that beset the introduction of worm gear some twelve or so years ago was the then existing prejudice on the score of efficiency. The Lanchester worm gear of today shows an efficiency of 95 per cent. and 97 per cent. under varying conditions.

Probably the most recent development of importance in connection with worm gears is the new method of testing introduced in the machine built to the author's design by the Daimler Co., Ltd. By means of this machine effciency tests can be made with a degree of accuracy not hitherto obtainable—the average error is probably less than one-tenth of 1 per cent., the National Physical Laboratory certifying the accuracy as within one-fifth of 1 per cent. from the truth.

The determination of the appropriate design of worm gear for any given duty is one that, like every other problem in engineering, depends upon the conditions that are given. In some cases the ratio of the transmission is a determining factor, it being essential to make some definite speed reduction; in other cases considerable latitude may exist as to the ratio of gear that may be employed, the external conditions, i. e., the revolution speed of the motor or some member of the transmission drive, being variable. In most cases it is the torque or horsepower to be transmitted that mainly determines the size and standard of the gear to be employed. In the application of worm gear to an automobile the most important variable factor is the weight of the vehicle. The road wheel diameter varies comparatively on any given class of car, otherwise it would be more accurate to say that the main variable is the torque on the driving axle. The fact that the road wheels in common use vary but little in diameter means that the torque on the rear axle for a given road duty is approximately proportional to the weight of the machine. It is quite true that one of the important factors in the resistance of an automobile is wind reaction, but the maximum load on the transmission is determined by the resistance on heavy gradients where the speed is insufficient to render windage of importance. On the lower gears the torque transmitted by the worm due to gravity alone is considerably greater than the torque required to overcome the combined resistance of gravity and windage on the higher gears.

A very interesting point arises in considering the influence of speed from the present aspect. As a general rule, efficiency is one or two per cent. lower at very low worm speeds than at worm speeds of 800 to 1,200 revolutions per minute; this not only means that the loss of power is greater, and, therefore, the heat generated on the worm teeth is greater per revolution of the worm, but it also means (which is really more important) that the lubrication film is thinning down considerably. If in two comparative cases we suppose the given motor car to be climbing a steep hill, in one case on its high gear with a comparatively great velocity, and in the other case on its low gear at a comparatively low velocity, and, therefore, transmitting considerably less horsepower, the worm gear will be under less severe conditions in the car at high speeds in spite of the fact that the horsepower transmitted is greater; consequently, we have the paradoxical fact in the application of worm gear to the motor car that in two cars of the same weight a given worm gear will stand up as well or better in the case of a high-powered machine than in the case of a low-powered machine. This result, which follows almost logically from the tests conducted by the representative of the National Physical Laboratory at the Daimler Works, has been long known to the author as a matter of experience, and the reason has been fully appreciated, but it has only been since the new Daimler testing machine has been built that it has been possible to put so unexpected a fact definitely on record. The practical conclusion has been reached previously as the result of experience gained in applying the same standards of worm gear from year to year to successively more powerfully engined cars. It was found that whereas an engine of higher power gave no trouble at all, some attention was needed when the weight of the car was increased; during the last ten years, during which period car weights have gradually increased (principally owing to the demand for luxurious body work), it has become increasingly necessary to pay attention to the quality of the bronze and the hardening of the worm.

In discussing the subject of worm gear broadly, some explanation and definition of terms is desirable. By a screw gear is meant a gear in which the two components are cylindrically cut screws, and in which for any given cylindrical surface the tooth angle is the same at all points; in this respect the screw gear differs from the worm gear, inasmuch as in the worm gear the teeth of the worm wheel are not parallel screws, but the teeth are of greater diameter at the extremities. In the ordinary worm gear, such as is commonly used for motion transmission, and as used by many makers for power transmission, the worm itself retains its cylindrical form, and is, in fact, virtually a screw gear; but in the Lanchester gear, as in its forerunner, the Hindley gear, both worm and wheel are hollow-faced, the worm being, as Americans sometimes say, of "hour-glass" form.

The maximum horsepower that can be transmitted through a pair of gears of given design depends upon the pressure that can be safely transmitted between the teeth. In an ordinary journal bearing, the transmission of pressure, and the limiting pressure that may be used, has a more or less definite meaning; thus in the case of a plain bearing the presence so specified means defintely the mean pressure on the oil film. In the case of worm gear, however, it is necessary to make use of a convention in speaking of the tooth pressure, since we do not know the precise area over which the reaction at any instant is distributed. It has been the custom of the author for many years to express the force transmitted by the teeth as a pressure per square inch on the projected area of the worm-wheel teeth. On this basis worm gear cut according to the author's system will carry easily one ton per square inch, and is good for an overload of two or three times that amount; in fact, a load of two tons per square inch may be looked upon as a safe load, inasmuch as the gears will run satisfactorily with such a load for an indefinite period.

STANDARDIZING MOTOR CARS

A gentleman, speaking as if by authority, has the following to say. An argument could be sustained and many of his assertions controverted, but it gives a side of the situation as some see it.

"There are two distinct tendencies in manufacturing among automobile makers, the European method and the American. The European maker relies on hand work; the American maker on automatic machinery, depression of overhead charges and the adoption of standardized construction.

"As a result of the American method of manufacture, the American dealer can sell an exceedingly good car at an exceed-

ingly reasonable price. The successful American invasion of the European continent is made possible by this adoption of standardization. It has been responsible for the cognizance which the European manufacturer has taken of our automobile industry.

"The general impression has hitherto been that there were only two types of motor car built in America, and that these types were the manufactured and assembled. Any car all the parts of which are built in a single factory has come to be distinguished as the manufactured type. The car which is assembled in a single factory, after its parts have been built elsewhere, has come to be distinguished as the assembled car. The crux of the whole situation, however, is that there is no such thing as a car all parts of which are built in a single factory, and it is equally true that the so-called assembled-type car is rapidly going out of existence.

"Permit me to qualify this last statement by explaining how the assembled car up to this time has been built. The first thing determined in the construction of an assembled car has been its price. Whatever parts could be bought and installed and still leave possible the sale of the car at the established price were incorporated. You can readily see that under this method, if the engineering department of a factory selected a certain motor because of its efficiency and the price of this motor would not permit the car to be sold at the price originally set, this motor would be disregarded and the cheaper one substituted. Throughout the entire car this fact held true. The car was built to sell, not to give service.

"Such methods of construction were fundamentally wrong, and therefore doomed to failure. In my opinion, there are not a quarter of a dozen cars in America today which are assembled in the original sense of the word. All of our successful makers have either accepted standardization as final or are doing so just as rapidly as factory investments in machinery, etc., will permit.

"The advantages of standarization accrue not only to the manufacturers but to the dealer and user as well. After a man has driven a standardized car he will find that his opportunities for obtaining service on tour are vastly increased if the parts of his car are made by well established accessory and parts manufacturers. The large parts makers who contribute to the construction of the truly standardized car maintain elaborate service branches at every town of importance throughout the entire country and these are accessible to the user at all times."

NEW ENGLISH TYPE OF MOTOR VEHICLE

English motor vehicle manufacturers, who have been trying in vain for the last two or three years to meet the American importation of low-priced automobiles, are now booming the cycle car, a cross between the motorcycle and the automobile, according to a monograph entitled "Developments of Motor Vehicle Trade Abroad" just issued by the Bureau of Foreign and Domestic Commerce, at Washington. The cycle car has either three or four wheels and an engine of three to ten horsepower and one or two cylinders. It can attain a speed of 30 or 40 miles per hour, and can seat two, three, or four persons. It is of light construction, and will not, of course, stand the wear and tear of a heavier automobile, but on the excellent roads of England it will give a great deal of service. The chief merit of the new vehicle, however, is its price, which runs between $400 and $700. Whether it will have any appreciable effect on the trade in inexpensive American automobiles is yet to be seen, some dealers thinking it will create its own market and will not compete seriously with the established trade, while others express the opinion that if it should become widely popular American manufacturers would begin to turn out cycle cars as they do small automobiles now and thereby keep their hold on the British market.

The monograph referred to deals with recent developments in the world trade in motor vehicles and is divided into two sections, one describing the markets for automobiles and cycle cars and the other the sale of motor cycles. It is in the nature of a supplement to a booklet issued last May, dealing in a comprehensive manner with the automobile trade in all parts of the world.

AUTOMOBILE CHAMBER OF COMMERCE, INC., IS FORMED

The Automobile Chamber of Commerce, Inc., was organized in New York City, March 19, by a formal merger of the former National Association of Automobile Manufacturers and the Automobile Board of Trade. The purposes of the new body are to advance each and every interest of the automobile industry and its members, to work for the enactment and enforcement of beneficial laws and to promote harmony among the members of the industry; finally, to "acquire by grant, gift, purchase, devise or bequest, to hold and to dispose of such property as the purposes of the corporation shall require, subject to such limitations as may be prescribed by law, including inventions, letters patent and processes, or rights thereunder, for the benefit of its members and not for pecuniary profit."

The officers of the corporation are: Charles Clifton, president; W. C. Leland, vice-president; Col. George Pope, treasurer; R. D. Chapin, secretary. The board of directors is composed of the following: Charles Clifton, Charles C. Hanch, Hugh Chalmers, Sydney Waldon, Samuel T. Davis, W. C. Leland, Windsor T. White, William E. Metzger, H. O. Smith, Albert L. Pope, L. H. Kittredge, R. D. Chapin, G. W. Bennett and H. H. Rice.

In a general way, the work of the new corporation will be along the same lines as that of its parent bodies. There is a possibility, however, that new kinds of work will be taken on. The arrangement of Dyer licenses for the members, who number 100, will be settled in the near future.

PARIS SHOW DATE CHANGED TO OCTOBER

Paris will open the European show season with its exhibition in the Grand Palais during the month of October. This change from December to October was proposed in order to reduce the present slack season between the end of the active selling period and the placing on the market of the following season's models. It is believed that by making this change at least two months will be gained to the French trade, for work on the 1914 models will be begun about July, instead of being held back until September, as at present.

The change in the date of the Paris show will doubtless be accompanied by a change in the duration of the show. Up to the present the Paris Salon has lasted from 19 to 22 days, being open both on week days and Sundays. It is now proposed to reduce the period to 10 days, the show opening on a Friday or Saturday and closing on the following Sunday or Monday week. This will give ten clear days, including two Sundays. This change is proposed by members of the trade who find that a 22-day show causes considerable inconvenience to the commercial staffs. If the short show is adopted, the exhibition will probably be kept open until 7 or 8 o'clock in the evening, instead of closing at 6, as at present.

FOREIGN AUTOMOBILE TRADE OF GERMANY

The report of the Association of German Automobile Manufacturers for 1911-12 gives the increase in value of Germany's exports of automobiles in 1912 as about $5,600,000, or 49 per cent., compared with a gain of $3,500,00, or 47 per cent., in 1911. The passenger cars exported numbered roundly 6,800, as against 5,136 in 1911, 3,399 in 1910, 1,838 in 1909, 1,151 in 1908, and 958 in 1907. The automobile trucks exported during the same years numbered 640, 345, 225, 156, 141, and 249, respectively.

Motor vehicle imports in 1912 increased by about $595,000, or 21 per cent., while 1911 had shown a gain of 12 per cent.,

or approximately $300,000. The increase was chiefly in passenger cars, which numbered 1,650, as compared with 1,244 in 1911. While this indicates a considerable sale in Germany by foreign firms, the imports in 1912 were not so high as in 1907, the record year, when 1,812 cars were brought in. The imports of motor trucks increased in value about $238,000, or 62 per cent., as compared with a gain of $190,400, or 102 per cent., in the preceding year.

In 1912 there was one motor vehicle for each 927 persons in Germany, and the total production in the country was valued at approximately $86,000,000.

DIVIDEND TO GRABOWSKY CREDITORS

The Security Trust Co., trustee in bankruptcy of the Grabowsky Power Wagon Co., sent out dividend checks in March to those creditors who filed valid claims. The debts of the Grabowsky company were approximately $400,000.

The plant was sold for $110,000 to the Edward G. Budd Mfg. Co., of Philadelphia, manufacturers of metal automobile bodies, who have a large plant also in their home city. The machinery, jigs, patterns and other physical assets were sold to the Seitz Automobile Transmission Co., of Wynadotte, for $55,000.

The outstanding accounts did not bring any considerable amount, being covered by guarantees to keep the machines in repair. The first dividend amounts to 20 per cent., and about 15 per cent. will be paid when ordered by the United States Court.

THE LOZIER COMPANY INCREASES ITS CAPITAL

Stockholders of the Lozier Motor Co. at a meeting in Detroit, March 20, authorized an increase in the company's capital stock from $3,000,000 to $5,000,000. The approved increase consists of $1,000,000 in seven per cent. cumulative preferred stock and $1,000,000 in new common stock.

The present year marks the tenth anniversary of the Lozier car, the first model having been turned out at the Plattsburg factory in 1904. On March 15, 1911, the new $1,000,000 plant at Detroit commenced active operations with the shipment on that date of the first car to be completed in the Detroit plant. Between 1,200 and 1,500 men are employed in the two plants at Detroit and Plattsburg and in order to keep pace with the sales this working force may soon be largely increased.

THE AUTO AS A SCOUT

Reported surrounded in some canyon in Coahuilla, by federal troops and about to be annihilated, Carranza managed to be all over Coahuilla in two days. Huerta was nonplussed—the federal authorities in Mexico City, often annoyed by the cutting of wire and rail communications between the capital and Coahuilla battlegrounds, finally requested scouts to report officially on the ubiquitous nature of the revolutionary leader.

It was discovered that Carranza did cover an almost astounding amount of territory in his operations against the federal government or in his retreats before superior forces of the government's soldiers. In doing so he made use of a Mitchell car.

CONVENIENT STORAGE OF SIDE CURTAINS

Better than storing side curtains away in the compartment under the rear seat, where they are liable to be covered with all of the paraphernalia incidental to each trip, with obvious creasing and cracking of the material and breaking and scratching of the celluloid lights, is the method of storing them in a sheet metal tube made for the purpose. Such a tube, 29½ inches in length, and 6 inches in diameter, formed of No. 24 iron and provided with a partition 7 inches from one end, will serve to protect the curtains and also a pair of inner tubes; the tubes naturally are carefully rolled up and placed in the 7-inch compartment. Covers for both ends should be provided for the exclusion of dust and moisture.

GOODYEAR IN BRAZIL

The Brazilian government has awarded to the Goodyear Tire & Rubber Co., of South America, the erection and establishment of a complete rubber manufacturing plant in the Brazilian capital city and the erection of a rubber washing plant in the city of Manaos, on the Amazon. As yet the details of this important award are not known, but it is to be presumed that they are in accord with decree No. 9,521, dated April 17, 1912. This will mean that they will have to purchase a large amount of machinery and building material at once, as the buildings and plant must be running one year from the date of signing the final contract.

SPECIAL MOTOR VEHICLE FOR AUSTRALIA

A large quantity of wool has often to be transported on the backs of "bullockies," or cattle, over wide stretches of waterless country. This results in great hardship for both animals and drivers and in heavy expense in getting the wool to market. In order to provide a better means of transport a Sydney firm has had a gasoline motor vehicle specially built that is expected to revolutionize the pastoral, agricultural, and mineral cartage conditions. The vehicle was produced in Glasgow after exhaustive experiments, and has a ground clearance of considerably over two feet. It is fitted with driving wheels five feet in diameter and has a winding gear of immense power to pull itself out of holes. It will handle loads of eight tons on formidable country tracks.

THE OFF-SIDE ENTRANCE

A simple method of giving easy access to the driving seat from the lever side is to make the driver's half of the seat to tip up. The off-side door should then extend from the scuttle to as near the driving seat back squab as required. If the chassis is a short one, this method can also be adopted on both sides of the car, thereby giving a compact seating arrangement, while the scuttle protects the knees more closely.

EXTRAORDINARY MOTOR CAR OUTPUT

The Ford Company intends to produce one hundred thousand vehicles in 1913. Already the output by months bears out a semblance that the prophecy will be fulfilled.

It is a simple, sturdy little car, low in price and seemingly high in efficiency. As a revenue producer it is so far in the lead that there is no second.

PERFECTION MEN IN TOLEDO ENTERPRISE

Interests identified with the Perfection Spring Co., of Cleveland, have acquired a 5½-acre site in Toledo on which will be erected a plant for the manufacture of springs, chiefly for the John N. Willys's factories. The Perfection plant in Cleveland will be continued, and it is probable that the Toledo enterprise will be conducted under an entirely different corporate title.

MILLION DOLLAR TIRE FACTORY FOR BALTIMORE

The Dreadnaught Tire & Rubber Co. has been incorporated with $1,000,000 capital to build a tire factory in South Baltimore. The officers are A. F. Gilbert, president; C. P. Triplett, vice-president and general manager; Wilmer Dunbar, secretary; Walter E. Hill, treasurer.

Wood-working Shop.

STANDARDIZING WAGON HUBS

During the year 1910, in the manufacture of hubs for about twenty-odd wagon manufacturers, I had about 200 sizes to work from and probably half as many different patterns.

Many of the wagon manufacturers call for hubs to be turned during the months of January, February and March, out of winter-cut timber. In this section (northern Minnesota and Wisconsin) birch timber gets about as hard as stone at this time of the year, and some of the patterns are almost impossible to turn when the timber is frozen. You will say, most likely, that a standard hub would be as hard to turn as any other; but just a moment. Let us look at Fig. 1.

Any one at all familiar with the hub business will tell you that a hub similar to Fig. 1 is a hard hub to make in cold weather. The diameter at center of this hub is 9½ in. and the front end is 6½ in. The center of the bearing on hub is 5½ in. from the front end of hub. The mortise is 2¼ in. long. After allowing ¾ in. for spoke band, we have 2⅜ in. left to

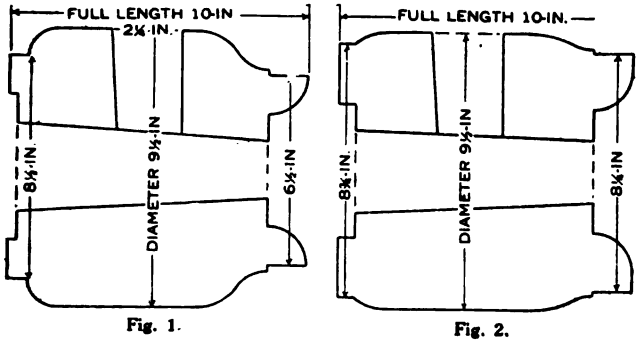


Fig. 1. Fig. 2.

drop down from 9½ in. to 6½ in., which shows an ogee pattern similar to Fig. 1.

A standard hub could be established, say, similar to Fig. 2. This calls for the same dimensions as in Fig. 1, with the exception of the front end, which is 8¼ in. in diameter. This makes a very nice looking hub and one that I can safely say will stand the weather from two to three years longer than one like Fig. 1.

One of our hub manufacturers from Wisconsin, at the hub makers' convention in Cincinnati, made the remark: "You would be surprised to see how much of an expert a man will get to be if you have him do one thing all the time." He was referring to machine men at his factory, but at the same time, if we had a standard hub to make, would we not get to be eminently proficient in the turning of this one shape?

The hub mill foreman has lots to contend with, as many of the wagon manufacturers are very hard to please. But when a man is called into the office and handed what looks to him like the President's message to congress, and, after reading eight or ten pages of typewritten copy, he finds that he has placed the mortise 1/64 in. too close to the back end of the hub, he feels as though he never wanted to see a wagon hub again or that a standard hub should be established.—F. W. Pool, in Wood Worker.

THE LIGHTING OF WORKSHOPS

The question of light in a workshop of any kind is of the first importance. Top lighting usually provides the best general light, whether it be natural or artificial, the diffusion usually being so much better than side lighting, which shows on one side only, although if two sides can be made available for the admission of light so much the better. In any case, the windows for the admission of natural light should be large, while the window and sash framing should be as small as possible.

If possible, with natural top lighting, the light should come from the north or northwest; but in any case the windows should be so arranged that the direct sun rays do not fall directly on the articles being worked on. This can be done by arranging the roofs on the ridge-and-furrow principle, with glass on the north side, and then, by carefully whitening the inside of the slated roof, very little light will be lost.

There is little need of special preparation of whitening mediums; but if ordinary ball whiting is reduced, with skimmed or separated milk, to the consistency required, and a little carbolic acid added to prevent decay, the wash will not come off, this making an annual renewal each September sufficient for all practical purposes.

Where ordinary skylights are used, a thin blind should be provided to obstruct the direct sunlight, this being on a roller conveniently placed, the blind only being used during sunshine. If treated with a weak solution of sulphate of copper, such blinds last longer, and, as this costs little, it may well be considered.

In arranging for side lighting as large windows as possible should be used, and these should come as low as possible, as during at least part of the year natural light is feeble.

Roller blinds of scrim should be used to obstruct direct sunlight when it becomes too powerful, and where it is desired to prevent the work people from too much window gazing, rolled or otherwise obscured glass can be used without much reducing light—only the lower panes, of course, being of this material.

Paint and other substances which obstruct the passage of light should not be used for workshop window obscuration, and for temporary exclusion of very bright sunlight, blinds should always be used.

For general artificial lighting, the whole of the roof (or ceiling) and the walls should be kept whitewashed, and fairly powerful lights so arranged that the light is thrown upward and outward should be used, this causing a diffused light to be spread over everything, its intensity varying with the power of the lights used. Such lights should be well up in the place to be lighted, in all cases being three or four feet above the heads of the persons working under them.

Low power lights should also be put in for lathes and other tools, and these should be of an adjustable character. In some cases suspended lights which will slide or in some other way move vertically will be preferable, while in others simple swinging brackets with two or three joints will give the greatest service, in each case the object being to provide the most convenient form of lighting for any particular machine or process.

For convenience, electric lights are about best; but very many workmen prefer gas, as this, they say, does not tire the eyes so much—a point possibly they are quite competent to judge so far as they are personally concerned.

For many temporary purposes portable appliances can be used, oil being used in conjunction with compressed air; but for numerous purposes lamps of some kind are quite a necessity, as other appliances—candles, perhaps, excepted—could not be used, owing to local conditions. Close quarters in which to work will largely govern the form of lamp used, and then, again, the vibrations caused by the use of hammers and per-

cussive tools will render many otherwise desirable lamps impossible to use.

For these reasons more than one form of lamp becomes necessary where general work is done, and these lamps should be kept in the stores ready for use, and when done with should be at once returned, so that they may again be got ready against the next time they are wanted.

The material on which work is done has a rather strong bearing on the methods of lighting adopted, because while one particular material, by reason of its absorbing light, will require special brilliancy of lighting, another, for the opposite reason, will require a more subdued form.

If you are working on, say, black velvet, a very strong light will be necessary; but, on the other hand, if you are working on polished metal, that light would cause such a glare and glitter that the eyes would be dazzled, and work could only be carried on in a very uncertain manner.

No fixed rule can be made as to the amount of light needed per person employed in any particular trade if calculations are based on the candle power required; but sufficient light for each particular individual must be provided, or both work and workman will suffer, and produce a reduction in the work done.

Personally, the writer does not believe that working by artificial light produces the results which occur where only daylight is used; but, at the same time, in most places artificial light has to be used to some extent. This is unavoidable during part of the year, naturally; but in very few cases is it necessary to work overtime, if the work is properly arranged.—Walter J. May, in the English Mechanic.

A BOX TRICK—HOW WAS IT DONE?

We have often heard of Houdini, known as "the Handcuff King," escaping from all kinds of fetters and strong boxes, but last week he mystified his audience after being nailed up in a good, sound British-made packing case at the Finsbury Park Empire.

The employes of Wood & Co., timber merchants, 216a Seven Sisters road, London, N., challenged Houdini to allow himself to be inclosed in a strong packing case made, nailed, and securely roped by them in full view of the audience.

The test took place at the second house on Wednesday night, February 26. The necessary timber, nails and rope were handed on to the stage by Mr. H. Arthey, foreman, and several other employes. The timber was cut up and the box was absolutely completed in full view of the audience.

Houdini was then put inside, and finally well nailed in and strongly roped up. A curtain was then drawn round the box. It was only a matter of nine minutes later that the challengers and audience were astounded to see Houdini pull the curtain aside. He had escaped.

The box, which was intact, was revolved on its corner and opened for inspection by all present. The challengers are still mystified as to how the trick was done.—Timber Trades Journal.

PHILADELPHIA VEHICLE ASSOCIATION ELECTS OFFICERS AND HOLDS ANNUAL BANQUET

The regular monthly and eighteenth annual meeting of the Carriage, Wagon and Motor Vehicle Association of Philadelphia was held at the Hotel Hanover, Friday, March 21.

The subject for discussion was a continuation of the subject of the February meeting: "How to Increase Your Business." Messrs. Schanz, Preisendanz and Keachline were the speakers, and they treated the horse-vehicle business in a manner that was very optimistic and encouraging.

The election of officers resulted as follows: President, William McGonigal; vice-presidents, Horace Ervien, Edward Preisendanz, William Friedrich; secretary, Henry F. Keachline; treasurer, Frank Schanz; executive committee, three years, Charles Wacker, Albert Kohler, H. Kerstein. Messrs. Keachline and Schanz were chosen for the eighteenth consecutive time to serve, respectively, as secretary and treasurer.

William McGonigal, the new president, was born near Dover, Del., in 1863, but moved with his parents to Virginia in 1869. After attending school in Norfolk, Va., he went to Philadelphia, where he engaged in the grain and feed business. In 1903 he purchased a wagon plant at 115 De Lancey street, which he has carried on successfully, still retaining his interests in the grain business.

The eighteenth annual banquet and dance of the association was held on Thursday evening, March 27, at Turner's Hall, Broad street and Columbia avenue, Philadelphia.

Frank Schanz, who has been treasurer of the Philadelphia builders' association for the past eighteen years, acted as master of ceremonies and introduced William McGonigal, the newly-elected president, to the audience. Mr. McGonigal made a neat speech, which was received with loud applause. There were no other speakers.

A capable orchestra discoursed lively music throughout the dinner and remained for the dancing which followed.

HE GOT THE JOB

WANTED—First-class, ugly male stenographer. Must be fast, much experience and highly recommended. Good salary. Apply to Somers Buggy Co., Barnesville, Ga.

The above want ad appeared in the city newspapers. The Summers Buggy Co. has a new stenographer, but he is far from being "ugly," for he is said to be a very handsome young man and of excellent business qualifications.

Why did the Summers Buggy Co. advertise for an "ugly male stenographer," and why is it now satisfied with a good looking one?

It is an interesting story in which good looks, popularity with the fair sex, the temptations of cupid and a parent's solicitude form the ground work.

C. O. Summers, the general manager of the Summers Buggy Co., and the man who advertised for the "ugly male stenographer," has a son who was christened "Riley," but whom the girls insist upon calling "Snookums." The young man is excessively popular with the ladies. His good looks, his pleasing address and his affable manners won for him enough admiration to make the classiest Beau Brummel take a rear seat in the peanut gallery. Automobile joy rides, theatre parties and pink teas kept the young man too busy to be compatible with business ethics—so the pater thought.

So he advertised.

In the mean time, the handsome son decided to eschew joy rides, theatre parties and pink teas, and get down to business, and his father gave him the stenographer's job.

IN THE SHOP

"Life is a hard grind," said the emery wheel.

"It's a perfect bore," said the auger.

"It means nothing but hard knocks for me," sighed the nail.

"You haven't so much to go through as I have," put in the saw.

"I can barely scrape along," complained the plane.

"And I am constantly being sat upon," added the bench.

"Let's strike," said the hammer.

"Cut it out," cried the chisel; "here comes the boss."

And all was silence.—Illustrated Carpenter and Builder.

BODY WORKERS WILL LOCATE ELSEWHERE

The former employes of the B. C. Body and Carriage plant at Bellefontaine, having failed in their attempt to induce local capital to rebuild the works which were recently destroyed by fire, are planning to locate elsewhere. At the time the plant was destroyed the works employed from 35 to 40 men.

NEW TARIFFS FILED WITH INTERSTATE COMMERCE COMMISSION

Missouri Pacific, I. C. C. A-2669, March 1. Farm wagons and farm trucks, 15c, and wagons and parts thereof finished and unfinished, 21c from Ft. Smith, Ark., to Muskogee, Okla.; wagons and parts thereof finished or unfinished, from Springfield, Mo., to Muskogee, 17½c; from Ft. Smith, Ark., to Henryetta, Okla., 29c.

Atlantic Coast Line, I. C. C. A-2493, March 11. Wooden vehicle parts (including wooden vehicle parts ironed, but not including wagon parts) N. O. S. K. D. in crates or bundles in the white, from Sanford, N. C., to Chicago, C. L. 53c, L. C. L. 85c; Cincinnati, C. L. 50c, L. C. L. 85c; Cleveland, C. L. 48c, L. C. L. 77½c; Indianapolis, C. L. 51c, L. C. L. 82c; South Bend, Ind., C. L. 52c and L. C. L. 83c.

C., St. P., M. & O. Sup. 4 to I. C. C. 3789, March 11. Vehicles classified as in Western Classification as vehicles (except self-propelling vehicles, children's vehicles and hearses, and parts thereof) and farm wagons and farm trucks from St. Paul and Minnesota Transfer and Minneapolis to Calumet, Mich., 31c; Hancock and Houghton, Mich., 25c, and Linden, Mich., 30c.

Atlantic Coast Line, I. C. C. 2511, effective in South Carolina March 1, interstate March 15 (S. P. 23877). Buggies, carriages and wagons, released from Sumter, S. C., to Pitts, Ga., wagons, boxed or well crated, package exceeding 34 inches but not exceeding 54 inches in height, K. D., L. C. L. agreed to be of value of $15 per 100 pounds, $1.44 (R); Porterdale, Ga., $1.32 (R.); Riverton, Ala., $1.80; Rockwood, Tenn., $1.53 (R.); this tariff carries numerous rates to common and local points in Alabama, Florida, Georgia, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Virginia and West Virginia.

Eugene Morris, Agent (for C., B. & Q., etc.). Sup. 11 to I. C. C. 270, March 15. Vehicle parts L. C. L. iron wheels (rubber tired) for children's vehicles from Anderson, Ind., to Waterloo, Wis., 68½c (R.).

Southern Ry., Sup. 5 to I. C. C. A-4873, state in South Carolina February 16, interstate March 15. Carriages, buggies and trotting wagons, boxed or well crated, C. L. minimum weight 8,000 pounds, from Sumter, S. C., to Gordon, Ala., $1.08 (A.); to Ashford and Cowarts, Ala., $85.90 per car (A.). This tariff also contains rates to numerous other Southern points.

Texas & Pacific Ry., I. C. C. State February 11, interstate March 25. Buggies, carriages and road carts, K. D. crated from New Orleans to Brevelle, La., L. C. L. $1.12½; farm carts and wagons between New Orleans and Mansura and Moreauville, La., L. C. L., 50c.

Lake Erie & Western, Sup. 12 to I. C. C. 2261, effective in Indiana February 20, interstate March 27. Wooden butts, bandle bolts, stave bolts, heading bolts, from Kokomo to South Bend, Ind., 6½c (R.).

N. C. & St. L. R. R., Sup. 16 to I. C. C. 1640-A, March 27. Vehicle material to Baltimore, Md., from Tullahoma and Shelbyville, Tenn., vehicle materials in the white, C. L. 33½c (A.), L. C. L. 38c; vehicle parts, C. L. 33½c (A.), L. C. L. 39c; from McMinnville, Tenn., vehicle material in the white, C. L. 35½c (A.); to Philadelphia, from Tullahoma and Shelbyville, Tenn., vehicle material in the white, C. L. 34½c (A.), L. C. L. 39c; vehicle parts, C. L. 35c, L. C. L. 43c. This tariff also contains numerous rates to other eastern seaboard points from points in Tennessee.

Northern Pacific, Sup. 3 to I. C. C. 5219, March 30. Wagons (not pleasure or passenger vehicles) and parts thereof and farm wagons and parts thereof, wagon seat springs, etc., to Jamestown, N. D., from Beaver Dam, Wis.; Beloit, Wis.; Watertown, Wis.; Madison, Wis.; Dixon, Ill., and other Wisconsin and Illinois points 51c (R.). The above rates become effective April 12. Also rates from same points to Wahpeton, Fargo, 37c; Oakes, 42c, and Edgely, N. D., 50c, effective March 30.

Illinois Central, I. C. C. A-8357, state March 10, interstate April 1. Vehicles, viz.; buggies, light spring wagons and carriages from Indianapolis to Burlington, Ia., 25½c; Clinton, Ia., 26.6c; Davenport, Ia., 11½c; East Clinton, Ill., 12.6c; Ft. Madison, Ia., 12.4c; Keokuk, Ia., 12.4c; Moline and Rock Island, Ill., 11½c. Vehicle bodies (except for automobiles, children's vehicles and hearses) and cutter bodies in the white, unfinished; vehicles (not self-propelling and excepting children's vehicles and hearses), from Indianapolis to Burlington, Ia., Davenport, Ia; Ft. Madison, Ia.; Hannibal, Mo.; Keokuk, Ia.; Keithsburg and Moline, Ill.; Quincy and Rock Island, Ill., and Muscatine, Ia., 24½c (basis, 14c to Peoria, Ill.). Also (I. C.) Sup. 2 to I. C. C. A-8314, April 1. Wagon boxes and end gates, from Omaha, South Omaha and Council Bluffs to Sioux Falls, 23c (A.).

Minn. & St. L. R. R., I. C. C. B-82, April 1. Wagon boxes from Oskaloosa, Ia., to Indianapolis, 27.9c.

N. C. & St. L. R. R., Sup. 17 to I. C. C. 1640-A, April 2. Spokes, club turned, from Bridgeport, Ala., to Tullahoma, Tenn., 3½c (R.).

A denotes advance. R denotes reduction.

NEW YORK CITY TO URGE TAX FOR USE OF STREETS

To protect the city streets, George McAneny, borough president, recommended to the board of aldermen that a municipal tax be levied on all classes of vehicles, particularly trucks.

In his message to the aldermen, Mr. McAneny wrote:

"Consulting engineers of the five boroughs have had under consideration the desirability of obtaining better control over the use of the streets of the city by vehicles transporting excessive loads.

"Certain vehicles are operated with too narrow tires for the load transported. This results in cutting a gash in an asphalt pavement, which utterly ruins it. The tire should be proportioned to the load the vehicle is intended to carry.

"Other vehicles are too heavily loaded for any pavement to support. Our pavements are built upon a six-inch concrete foundation. This will support an exceedingly heavy traffic. But if a foundation is to be laid to support some of the loads now commonly seen on the streets the cost of street construction will be greatly increased, thereby imposing a heavy tax upon the city at large for the benefit of a few.

"A third class of vehicles are those having an excessive width. The main thoroughfares of the city recently have been widened at considerable expense in order to accommodate two lines of traffic, of regulation width, going in opposite directions. A modern automobile truck or van, measuring eight or nine feet in width, will completely block one extra line of traffic, thereby reducing the capacity of the street by fifty per cent. in either direction."

Mr. McAneny purposes to regulate the hauling of heavy pieces of structural iron and steel by means of special permits.

BANQUET OF THE CHAMBRE SYNDICAL

From the Guide du Carrossier we quote an account of the banquet of the French-Carriage Builders' Association (Chambre Syndical) which was held in Paris in the Gallery of the Champs-Elysees. Two hundred and sixty-two were present. President Cottenet presided. Among those known in this country we note Messrs. Belvallette, Cottenet, Collet, Connolly, Heergeist, G. Kellner, P. Kellner, Labourdette, Mulliner, Thrupp, Van den Plas. Ladies were also a bright contingent among the guests.

After coffee President Cottenet welcomed members and guests in very happy terms, remarking especially the air of a family party that seemed to prevail. The distinguished foreign guests were referred to by name most graciously. The efforts of the association to better conditions were spoken of in terms of success, and the silver medal and diploma to be accorded to employes after 20 years of service with one establishment were touched upon. The president of the school

supported by the Chambre (M. Ernest Boulogne) was complimented on the results of his work for the school. Messrs. Dupont and Laborey were also complimented and at the conclusion all were invited to raise their glasses to the health of their friends, especially M. Kellner (elder) whose green old age and enthusiasm were the envy of the younger generation.

Then followed responses in the most complimentary vein by the foreign guests.

As a wind-up, the banquet hall was converted into a ball room, and the pleasure was continued until a late hour. The cotillion was led by Miss Georgette Kellner and Mr. Jean Cottonet.

THE EASTERN RUBBER CO., LTD., OF TORONTO

A new company has just been formed in Toronto, Canada, called The Eastern Rubber Co., Limited, with an authorized capital of $1,000,000, consisting of $400,000 cumulative preferred stock of a par value of $100, and $600,000 common stock with a par value of $50 a share. The company has been organized to manufacture all kinds of rubber goods, including auto, bicycle, truck and carriage tires, belting, hose, packing, and rubber heels. It took out its charter first under the name of the Dominion Rubber Co., Ltd. Subsequently it discovered that there was a company by this name in the province of Quebec. Consequently it changed its name to the Eastern Rubber Co., Ltd. Its principal officers are: Roger Miller, president; W. L. Horton, vice-president, and A. G. Gamble, director and secretary-treasurer.

ALLEGED INFRINGEMENT OF BATAVIA RUBBER CO. PATENTS

The Batavia Rubber Co., of Batavia, N. Y., has served the following notification upon five tire manufacturing companies:

"You are hereby notified that you are infringing upon the rights of the Batavia Rubber Co. in the making of a non-skid tire, which is so close an imitation of the 'Security' non-skid tire, which has been made by the Batavia Rubber Co. for many years, as to deceive purchasers seeking Batavia tires, and you will be held responsible by suits at law for any damages.

"We will wait a reasonable time for your notification that you will cease further infringement."

MEETING OF CARRIAGE MAKERS' CLUB

The March meeting of the Cincinnati Carriage Makers' Club was held at the Business Men's Club, March 13. Vice-president J. F. Taylor presided. Secretary Young submitted the resignations of Wm. J. Kauffman and F. S. Nelson, of the Enterprise Carriage Manufacturing Co., Miamisburg, Ohio.

The vote for governors resulted in the following being selected: P. P. Hunter, A. S. Brown, W. J. Brunsman and H. M. Pollock. They will elect a president and P. P. Hunter will be the man.

The chair appointed the following committee to draft resolutions on the death of A. T. A. Nelson: A. S. Brown, O. E. Walker and Theodore Luth.

TIRE COST REDUCTION

There seems to be a pronounced movement in the reduction of the cost of rubber tires. The reduction seems to have been inaugurated by the Goodrich-Diamond interests. It is slated as a discount of 10 per cent. to dealers from former prices.

The United States Tire Co. has not been slow to follow with about the same discount, and, of course, now that the subject of price is under pressure its effect will become general.

April is the time, as a rule, for fixing the prices for the following six months, so perhaps the cuts now in evidence will not be increased for a time.

The reduced price of crude rubber admits of a competitive fight for business of this kind, we assume, so that the warriors in the tire field will not emerge with many wounds in the vital bank balance. We hope not, at any rate.

IMPORTANT CHANGE

The D. M. Sechler Implement and Carriage Co. has made an important business change that will put it into the rank of just a producer, not a seller of product. This has been done through a contract with the Oliver Chilled Plow Works, of South Bend, which company will take over the selling of both vehicles and implements made by the Sechler Co., and will also use the Sechler selling force in conjunction with its own large staff.

As this arrangement is a three-year contract covering selling in all parts of the globe, it is fair to presume that as producers the Sechler concern will turn out a larger product than ever in its history. It seems to be a splendid arrangement for both parties in interest.

OLDEST WAGON MAKER IN MICHIGAN

Hartford claims the oldest active wagon maker in the state of Michigan. Sixty-two years of work at his trade is the life record of James Thomas, aged 80 years and five months, who upon every working day in the week may still be found actively engaged at the bench at the M. F. Hoover wagon shop on East Main street.

This veteran wagon maker began the mastering of his trade at the place of his birth, near Rochester, N. Y., 62 years ago. After working there for three years he went to Michigan in 1854, and has since resided continuously in that section of Michigan.

TO WIND UP UNITED RIM

The United Rim Co., of Akron, O., on April 5, formally voted to discontinue business and to dissolve itself. R. W. Bebee, secretary of the company, was appointed trustee for the purpose of winding up its affairs. The company was organized several years ago by a number of the best known tire manufacturers, who thought they saw a way out of certain difficulties by pooling their patent interests. For the last year or two, however, the ways of the United Rim Co. have not been entirely ways of peace, the parties to the arrangement having fallen away from it and undertaken the production of their own rims.

POLE AND SHAFT PLANT FOR ARKANSAS TOWN

John E. Van Cleave, a representative of the Pioneer Pole and Shaft Co., has selected a site for the erection of a plant at Camden, Ark., for the manufacture of poles, shafts, hubs and other wooden wagon material.

The mill will give employment to from 100 to 150 men. The site selected was donated by the Board of Trade as an inducement to have them erect a plant there. It is situated near the wharf on the Ouachita River, adjoining the Cotton Belt and Rock Island tracks, and a quarter of a mile from the Iron Mountain tracks.

WANT CATALOGUES OF BUGGIES

R. Wilfred & Co., Limited professional carriage builders and cabinet makers, McLeod road, Lahore, India, want catalogues. They say:

"We got your address from an old copy of The Hub, and request you to kindly supply us catalogues of coaches for our use as a sample and prospects (prospectus?) with prices.

"We also intend to import coaching goods and would thank you to send us the names of capable firms, or direct them to send us price lists at an early date."

Patent Law Revision Interests All

G. H. Montague, a New York lawyer, discusses and criticizes the Oldfield bill. His exposition of the matter may be very important to those who are mixed up in the inventing or using of patents, so a few of his observations are reproduced in order to give a clear idea of the state of mind of those who are to be affected if the Oldfield bill in Congress becomes effective.

During the spring of 1912 hearings were held for several weeks by the Judiciary and Patents Committee upon proposals to amend the patent laws.

In all essentials, the provisions which evoked opposition of manufacturers, inventors, and representatives of commercial associations appearing before the committee in opposition to the original bill reappear in the substitute. In addition, the substitute contains a number of provisions extending the application of the Sherman Anti-Trust Act, wherever patents are involved, to specific transactions which are not now covered by that act and which, if no patents were involved, would under the existing law, or even under the other provisions of the substitute bill, lie outside the prohibition of the Sherman Anti-Trust Act. These were not contemplated in the original Oldfield bill.

The three main proposals of the bill are these:

Compulsory licenses are authorized by providing that if any applicant shall establish in a federal district court that a patent owner who has purchased a patented invention from the original inventor is withholding it "with the result of preventing any other person from using the patented process" more than three years after the patent is issued, the court shall order the patent owner to grant to the applicant a license to use the invention upon such terms or royalty as the court deems just.

The non-enforcement of license restrictions is secured by providing that the patent owner shall no longer be permitted to bring an action for infringement of the patent, when the purchaser, lessee, or licensee of the patent article has committed a breach of the contract of sale, lease, or license by the conditions of which he obtained the patented article.

The extension of the Sherman Anti-Trust Act is effected by providing that any patent, used as part of any combination in restraint of trade or commerce among the several states or with foreign nations, or to monopolize or in any attempt to monopolize such trade, or used in any manner prohibited by this act, may be condemned in the manner provided by law for the forfeiture, seizure, and condemnation of property illegally imported; and also by providing that a violation of the Sherman Anti-Trust Act shall be conclusively presumed from any one of a long list of the most common business transactions, regardless of any surrounding circumstances.

The provocation for these radical innovations and sweeping changes was:

"First. The evils arising from the vendor of a patented article fixing the price at which the article must be resold to the public.

"Second. The evils arising from the vendors of patented articles prohibiting their use except in connection with other unpatented articles purchased from them.

"Third. The evils arising from owners of patents suppressing the same or prohibiting their use in order to prevent competition with other patented or unpatented articles sold by such owners of patents.

"As a remedy for these evils, it was proposed to limit the absolute right now vested in the owners of patents, under which they determine to what extent and in what manner the use of the patent or patented article shall be permitted. With this in view, it was proposed to take away specifically the right recognized by the lower federal courts to fix under the patent law prices at which articles shall be sold at retail, and also to take away the right recently confirmed in the Mimeograph Case to prohibit patented machines from being used otherwise than in connection with unpatented materials furnished by the vendor or licensor."

Whether these "evils" are actual, and whether the proposed changes in the patent law will bring any remedy or advantage, were the questions to which discussion was exclusively directed in the hearings upon the original Oldfield bill.

The fundamental rights of a patent owner under the laws of the United States read:

Congress has the power under Article I., section 8 of the Constitution to "promote the progress of science and useful arts by securing for limited times to authors and inventors, the exclusive right to their respective writings and discoveries.'

Pursuant to this power Congress has provided in section 4884 of the Revised Statutes that a patent owner shall have the "exclusive right to make, use and vend the invention or discovery." As the phraseology of the statute indicates, this exclusive right consists of three components, i. e., the exclusive right to make, the exclusive right to use, and the exclusive right to vend the patented article.

The patent owner, like the owner of any other property, "cannot be compelled to part with his own, except on inducements to his liking."

The patent owner's rights are much curtailed, as contrasted with the rights of other property owners, in that the owners of every other form of property may exercise their rights for so long a period as they and their successors may desire, while the patent owner may exercise none of his rights beyond the duration of his patent, and at the expiration of the statutory period of seventeen years must relinquish to the public all of his rights.

These rights have always been fundamental in American patent law. The right "to fix under the patent law prices at which articles shall be sold at retail," which the committee describes as "recognized by the lower federal courts," has been settled by the decisions of Circuits Courts of Appeals.

The substitute Oldfield bill proposes to deprive the patent owner of the right to sue such pirating dealers and manufacturers as contributory infringers, and to relegate the patent owner to separate actions for breach of contract against the army of small users. This proposal leaves the patent owner virtually without remedy. Even if a thousand such suits were successfully prosecuted, the damages would be small in each, and uncollectable in most, and less than the expense of litigation in all. Meanwhile, the patent owner would practically be helpless before the instigator of this piracy.

Considering the natural handicap thus imposed on the selling of patented articles, and the further fact that the patent owner must reap his reward before the expiration of the seventeen-year patent period, no aid which the existing law lends to the merchandizing of patented articles can well be called unfair. In his evidence, Mr. Louis D. Brandeis says:

"The fixing of a price has possibly prevented one retail dealer from selling the article a little lower than the other, but the fixing of that price has tended not to suppress but to develop competition, because it has made it possible in the distribution of those goods to go to an expense and to open up another sphere of merchandizing which would have been absolutely impossible without a fixed price. The whole world can be drawn into the field. . . . As you develop the article, you are inciting invention; and what is more important than

the invention, you are inciting the commercial development of the competing article."

License restrictions agreed to by owners when they obtain patented articles solely upon condition that they use them only with supplies that are specially prepared for them, or in continuity with machines that are especially adapted to them, or in some particular manner requisite in order to accomplish the purposes for which they are intended, were declared by numerous witnesses to be both necessary and proper.

The notion that such license restrictions might give patent owners the "practical monopoly of the market" for unpatentable products used with a patented device is disposed of by the fact that such a practical monopoly, far from offending the public policy, actually promotes the general welfare; because the patent owners can attain it only by cheapening the cost of manufacture of the patented article, and can continue it only so long as their invention is not superseded by subsequent inventions still further cheapening the cost of manufacture. As the Supreme Court explained in the Mimeograph Case:

"The market for the sale of such articles (i. e., unpatented supplies) to the users of his machine (i. e., the patent owner's patented machine), which, by such a condition, he takes to himself, was a market which he alone created by the making and selling of a new invention. Had he kept his invention to himself, no ink could have been sold by others for use upon machines embodying that invention. By selling it subject to the restriction he took nothing from others and in no wise restricted their legitimate market. . . . The public is always free to take or refuse the patented article on the terms imposed. If they be too onerous or not in keeping with the benefits, the patented invention will not find a market. The public, by permitting the invention to go unused, loses nothing which it had before, and when the patent expires will be free to use the invention without compensation or restriction."

Thus are the first and second classes of evils relied upon by the committee proved unreal upon analysis. The third class of evils, by which the committee seeks to justify the substitute Oldfield bill, are "evils arising from owners of patents suppressing the same or prohibiting their use in order to prevent competition with other patented or unpatented articles sold by such owners of patents."

"That patents in the United States are bought up in large numbers for the purpose of suppressing competition," continues the committee, "cannot be doubted." The committee cites no testimony that supports this statement. Instead, the committee goes outside of the testimony for proof of suppression and declares: "It has been the subject of comment and complaint in the public press for years.

Much solicitude is evinced by the committee lest the existing patent laws enable owners of patents to withdraw a large amount of personal property from the control of the state courts and state legislatures. Nevertheless, the committee recommends a scheme of compulsory license which gives every federal district court throughout the United States power to hale before it every patent owner (excepting original inventors) whose invention for any reason whatsoever has not come into use within three years after the issuance of the patent; and thereupon judicially to determine its value, and compel the patent owner to grant to any competitor who asks it a license to use the patent upon such terms as the court may fix.

Economists have long recognized that all the appalling consequences of over-population and starving conditions have been staved off in the United States during the past twenty years only by the progress of invention. The result of such a scheme of compulsory license, it was graphically shown before the committee, would be to diminish the inventor's market for his invention, to enable any strong competitor to crush its weak rivals, to impede every patent owner in developing and introducing his invention, to retard the patenting of inventions, and to discourage the large-scale invention and industrial experimentation on which civilization depends for solving the increasing problems of existence.

The substitute Oldfield bill provides that the vendor of any patented article becomes a criminal, if he attempts to secure a year's business as a condition of selling to a retailer; if he attempts to hold the retailer to his agreement to buy his patented goods exclusively or to a certain extent; if he attempts to hold the retailer to his agreement to maintain a standard price on the patented goods; if he agrees with a retailer in a town to sell his patented goods to no one else in the same town or to sell to other retailers only on less favorable terms, in consideration of which the retailer shall push the sale of the goods; or if he sells his patented goods in any particular territory at a less price than he sells elsewhere. Each of these transactions is made by the bill conclusive proof of the violation of the Sherman Anti-Trust Act. The fact that the transactions might reasonably be shown to have no tendency to restrain trade cannot save the unlucky patent owner, for the bill expressly provides that "restraint shall be conclusively deemed to have been or to be unreasonable and to be in violation of the provisions of said act" as to any party who performs any of these transactions. The penalty which the patent owner may suffer for doing any of these things is the forfeiture of his patents, a fine of five thousand dollars and a year's imprisonment; and the payment of threefold damages and the costs of suit and attorneys' fees to anyone who comes in within three years thereafter and proves any damage.

WORKING DRAWING COUPE-TORPEDO

(See illustration opposite)

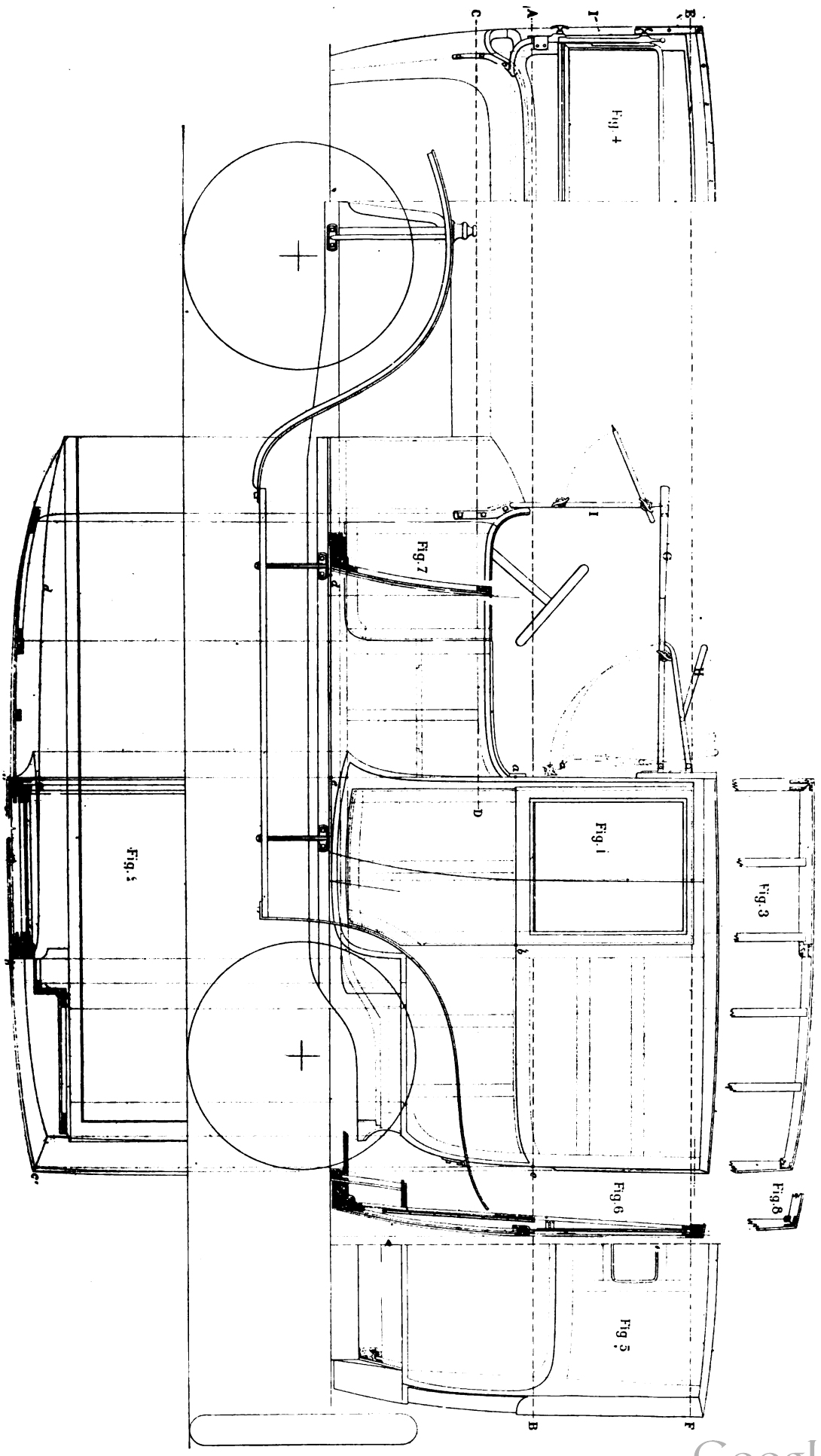
A coupe-torpedo has the body of a coupe and a driver's seat with one or two fore doors. We show a working drawing taken from the Guide du Carrosier, the measurements in metric scale, but out of line as we show it owing to the reduction of size necessary for reproduction, which could not be made in a scale and proportion.

The coupe is a city car essentially, with spare seats, but these seats are not comfortable enough for touring.

The dimensions of this body correspond with those of the large horse-drawn coupes. In this instance the body length is given as 1m 480 to 1m 500; the height 1m 480, breadth 1m 300, all these dimensions being said to correspond with the usual large coupe body, and they are desirable in so far as they have been found to adjust themselves to the comfort of the passenger better than any other. Sometimes the height of these bodies has been exaggerated. The driver's seat follows the ordinary usage. In the illustration the figure 1 represents the side elevation of the body, Fig. 2 the plane view, Figs. 4 and 5 side views of the back and front. The other figures simply give details of the plans. It will be hardly necessary to go into further details because the experienced draftsman can find these out for himself, making available such ideas as he thinks may be useful to him. The arrangement of the window glasses is said to be particularly good because in case of speed in a storm it would be difficult for the moisture to enter. This is seen in Figs. 2 to 6. The driver's hood is subject of patent, therefore not interesting.

USING HARD STEEL FOR BURNISHING

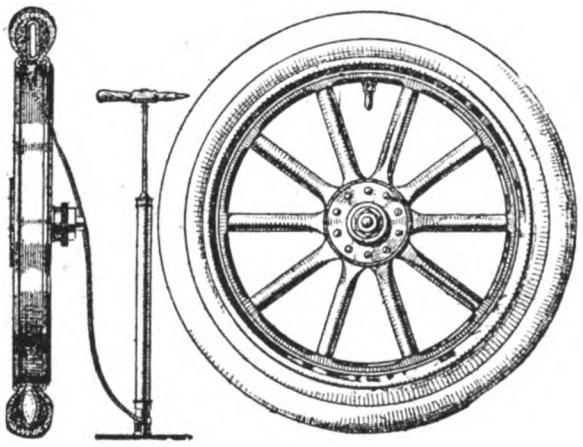
A fairly good burnisher for brass, copper or other soft metal can be made of a file or a piece of tool steel rod, hardened to the limit, with the end ground round and smooth and polished. The polishing must be as nearly perfect as possible, and there must be no scratches whatever. Held against a revolving piece in the lathe, or rubbed, with some little pressure, on a flat surface, the burnisher produces a hard, polished surface that is more durable and tarnishes less rapidly than a surface that is polished by abrasives.



WORKING DRAWING OF COUPE-TORPEDO

RIDING ON A VACUUM

Few persons who are unacquainted with the first principles of pneumatics realize the pressure of the atmosphere and the pressures which are being exerted at all times upon everything on this sublunary sphere. And it is possibly because this fact is not an obvious one that more use is not made of the ever-present pressure of the atmosphere. It is easy, of course, to see and appreciate the effect of compressing air, and to apply it to our needs, and we have for many years now all of us had personal and direct experience of the usefulness of compressed air in our tires. But it is not so easy to appreciate the fact that, while the weight of a car can be supported upon air in a state of compression, it is also possible to support it by air pressure without any air being contained within the tire at all! Yet it is so, and an American inventor has produced a pneumatic tire without any air in it, in which the weight is yet air supported, and he has done so by taking advantage of the pressure of atmospheric air due to the weight of the miles of air above us. In saying he uses no air at all within his tire is meant no air at all. That the tire is really empty of air and not merely "empty" in the common understanding of the term, which really means filled with air only at the same pressure within as without. In other words, this new inventor pumps the air out of his tires instead of into them, and so creates a vacuum inside them. How, then, does the tire work, and how does it obtain the necessary resiliency? Simply by the effort of its walls to open or expand under pressure being checked, and the otherwise bulging sides held up and supported by the pressure of the atmosphere on each side of them. Concerning



The Vacuum Tire

this, it may be well to reproduce the following extract from a letter of the inventor, who explains the matter thus:

"Air," says Mr. Woodcock, "is as effective below atmosphere pressure as above it. I might cite the air brake. Westinghouse used compressed air to operate his air brake, and the New York Air Brake Co. effected the same result by using a vacuum pump or ejector. The same principle holds good in tires, only there is more in favor of 'vacuum tires,' because blow-outs are impossible and puncture is next to an impossibility. Actual demonstration shows that about 12 inches of the circumference of the tire supports the car, 6 inches flatten at the point of contact with the ground, and about 3 inches each side of this are affected. As the vacuum chamber is 3 inches deep, there are 36 square inches each side of the tire in the act of bulging outward against atmospheric pressure of 14.7 lbs. to the square inch. If a complete vacuum exists in the vacuum chamber, this amounts to a little over 500 lbs. on the section 12 x 3 inches on each side of the tire, or 1,000 lbs. air pressure supporting the wheel. The pneumatic tire has about 600 lbs. resiliency, and I do not need a perfect vacuum to obtain the same result, but I eliminate the inherent defects of the pneumatic tire. I have been using these tires for nearly a year, and I have recently placed them on the market, and one customer has ordered 15, after having used them for several months."

The above will give the reader a fairly good idea of the new tire and its action, and the understanding will be helped by the illustration. It will be observed that, in another respect, its action differs from that of the conventional pneumatic tire in that the weight is supported on that part of the tire which is in direct contact with and comes under the influence of the ground, and not as, when compressed air is used, suspended within the circle of the air container. In the vacuum tire, the action of the air or, rather, the reaction against atmospheric pressure, comes into operation in successive sections of the tire as those sections are called upon to support the weight and come under the influence of the ground. It would also appear that there would be very much less strength required in the tire fabric, which would be relieved of the constant tensional stress which is thrown upon all the strands of it when employed to contain air under pressure, while the stress would also be taken off the beads, which would not be so likely to break away, and another point in its favor would be that, in the event of puncture occurring, repairs would be effected on the outside, so that there would be no occasion to remove the tire from the rim every time repair was required. As to what happens when a puncture does occur, it is probable the effect would be somewhat between driving on a deflated tire and driving on a solid one. Anyway, the development is a new one, and starts a line of thought and investigation in the opposite direction to that we have hitherto been accustomed to look, and it is possible it may have far-reaching results.

LETTER SPACING

Spacing letters in lettering words on bodies has its difficulties. There have been many ideas advanced to accomplish this, among them one here given is simple and practical.

The drawbacks to all lettering are found in the unequal thickness of certain letters, as for instance, I as compared with W, which prevents all lettering being equal distances apart. So ingenuity has to be used by the new hand to devise a way to overcome this trouble.

Most methods recommend trying out the word or words over and over until space is satisfactorily filled, which is very unscientific.

Nearly all books on lettering seem to take for granted that the reader has a general knowledge of the subject treated, and if he has not, he doesn't get much benefit from such books.

It must be acknowledged at once that free-hand lettering by the experienced worker is grace, beauty, and elegance itself, and there is no mechanical device or manipulation that can be made equal to it. But when the painter is in the artist class he doesn't need instruction; it is the one who is beginning who needs some plan that will enable him to avoid marking in and rubbing out until he gets his line spaced the way he thinks it ought to be to produce the effect he has in mind.

Here is a plan that has been thought out by a practical painter that is very simple and one that anybody can quickly understand and apply.

With such a layout as is to be described, letters for any length of space can be handled and they ought not to be much out of the way at either end of the line needed. The idea is to rule lines first horizontally, and then vertically, each kind of lines being exactly ⅛ of an inch apart. The advantage of using such narrow lines is that the width of a letter can be increased or decreased by almost imperceptible, yet exact measurement.

Using these spaces we may say that as a general thing ⅜ of an inch are given to one letter, and one of the spaces, or ⅛ of an inch, allowed as a space between letters. Not less than two spaces should be allowed between words, and sometimes more are even better. The height of the letters may be anything that will conform to the space to be worked upon and yet be symmetrical with the width. The limb also can be

anything it is wished to have it. It follows, of course, that any style of alphabet can be used. Take the words, "The Plumbers Company," which might be the line desired on the panel wagon, and the period inclusive at the end measure exactly 9⅜ inches; we won't bother with the fraction, so we will call this in round numbers 75 eighths. Now, suppose these words have to go into a line 6 feet 3 inches long, this would calculate 600 eighths, so all that has to be done is to divide 600 by 75 to get the number of lines each letter width must be prolonged. We find that eight is the number, so the letter on the copy 3 spaces or ⅜ inches wide multiplied by 8, or prolonged with the measuring compass eight times, will make the correct width, that is 24 eighths or 3 inches, and the spaces between letters one inch. Sometimes the whole number of eighths will not divide without leaving a remainder. Suppose we have a line six feet one inch for the total length as an example that these same words had to fit. The length 6 ft. 1 in. is 584 eighths divided by 9⅜ inches, or 75 eighths, will leave a remainder of 59 eighths. A simple way, of course, would be to shorten the space at each end by half of those 59 eighths, which would be 3 11/16 inches, thus prolong the letters seven times, which would make a 3-space letter 2⅝ inches wide, and the letter space ⅞ of an inch, while the space between words would become 1¾ inches. If it were not practicable to shorten the length, but the letters must fill it, then 59 eighths are distributed among the letters, spaces and word spaces. Counting up the words in the name we find there are 18 letters at two eighths to each, so that a 3-space letter, instead of being 2⅝ inches, will be 2⅞ inches. That gets away with 36 out of 59, then there are 15 spaces between letters, giving each ⅛ more, and there are left but 18, so place 9 extra between each word. It makes no difference that the letter N occupies five spaces and W six or seven, or I only one. The measurement is of the completed total 9⅜ inches and each individual item comprising it must be increased proportionately.

This may sound a little complicated at first, but it is really simple after you think it over. The quick way to avoid calculations would be to make a table of lengths so that it could be referred to at a glance; certain dimensions could be gotten at without any sums in arithmetic. Such a table would not necessarily have to be extended to more than 5 feet 9 inches in length to fill all the needs that any wagon letterer would run up against, but it can, of course, be made to extend any length desired.

A good way to make this available is to take a sheet of strawboard and on the white side rule horizontal lines the long way, and vertically the up and down way, using ink to make the lines, and ruling them carefully so that the eighths between lines will be exact. With this words can be brought out on it in pencil which can be easily obliterated if they are not according to your ideas of what the spacing ought to be. Get your correct measurements from such a copy and then go ahead.

We think that spacing on a plan such as we suggested would save a great deal of time and trouble, and be found very useful in the paint shop by those who have much about lettering yet to learn.

NO PATENT MONOPOLY ON WRAPPED TREAD

The United States Circuit Court of Appeals for the First Circuit, which sits in Boston, after four years' litigation, has confirmed the decision of the lower court in favor of the Fisk Rubber Co. in the suit involving the molds used in the manufacture of tire casings by the one cure wrapped tread process.

The suit against the Fisk company was brought by the De Laski & Thropp Circular Woven Tire Co., of Trenton, N. J., and alleged infringement of the P. D. Thropp patent, which invention "relates more particularly to apparates holding a clincher tire in position during the vulcanizing process," although it does not assert novelty in such process.

The chief advantage of the Thropp patent was that it claimed to permit the production of what has come to be known as the "wrapped tread" tire as distinguished from the molded tire.

In its defense, the Fisk company set up that the Thropp patent was invalid by reason of anticipation, which defense was upheld by the United States District Court in Massachusetts and finally, as stated, by the Circuit Court of Appeals, which latter held that the Thropp device had been clearly anticipated by drawings and molds made by the B. F. Goodrich Co. previous to April, 1905.

The Thropp interests claimed that the Goodrich devices were mere experiments, but the Court of Appeals held that that proof of anticipation "seems to us clear, unequivocal and convincing."

GASOLINE PRICES ON DECIMAL FRACTION BASIS

In New Jersey, the gasoline situation, at least so far as prices are concerned, has taken a peculiar turn. It has already resulted in a general revision of wholesale quotations, which are so finely drawn in decimal fractions that it will put dealers to some pains to check their invoices correctly. Unless the New Jersey legislature sees fit to step into the breach, even 1/100 of a cent hereafter will figure in the price.

This unsual state of affairs is one of the immediate effects of what was termed the "Seven Sisters" legislation, and which was aimed to correct certain corporation abuses. The particular section of the law which has caused resort to decimal fractions follows:

"It shall be unlawful for any person, firm, corporation or association, engaged in the production, manufacture, distribution or sale of any commodity of general use, or rendering any service to the public, to discriminate between different persons, firms, associations or corporations, or different sections, communities or cities of the state, by selling such commodity or rendering such service at a lower rate or price at a point away from that of production or manufacture as at the place of production or manufacture, after making due allowance for the difference, if any, in the grade, quality or quantity and in the actual cost of transportation from the point of production or manufacture, if the effect or intent thereof is to establish or maintain a virtual monopoly, hindering competition, or restriction of trade."

Immediately after the law became effective, the Standard Oil Co. of New Jersey announced that in order to comply with it, it had been found necessary to make new selling prices on all of its various products. As an example, the company cited the price of what is known as "tank wagon water white kerosene oil." In Bayonne, the manufacturing point, the Standard Oil Co.'s price is 8½ cents per gallon, and as the freight rate to Newark is 3 cents per barrel of 50 gallons, the Standard Oil Co.'s Newark price automatically became 8.56 cents per gallon.

DIAMETERS OF TRUCK WHEELS

The diameter of truck wheels is decided in practice by a compromise between conflicting considerations. The small wheel has the advantage of strength and small weight; it also subserves the need of a large gear reduction in the power transmission and contributes to stability by lowering the center of gravity of the vehicle. On the other hand, all roughness of the road surface becomes a matter of importance—a drain upon the power and severe upon the spring suspension and the occupants of the vehicle—if the wheels are too small. It has been observed that a truck with driving wheels of 60 centimeters diameter could not climb a paved grade of 3 per cent. which was only slightly slippery, because the wheels slipped at every projection in the pavement. Experiments with the military trucks have resulted in demanding a minimum diameter for the driving wheels of 95 centimeters and of 85 centimeters for steering wheels.

WORK OF TECHNICAL SCHOOL FOR THE SEASON—CLOSING EXERCISES APRIL 9

The day and evening classes of the Technical School for Carriage Draftsmen and Mechanics, in the City of New York, closed a brilliantly successful season under the able direction of Mr. Andrew F. Johnson, the instructor.

The afternoon and evening of April 14, the work of the students was displayed for inspection. The crowded rooms in the evening were significant testimony to the interest taken by employers and workmen in the subject.

The school occupies two very large rooms on the sixth floor of the Mechanic's Institute, and there was not an available yard of wall or table space unoccupied by the work of the pupils, yet it was not practicable to find room for all that could have been displayed.

There were shown fourteen full-size working drawings of automobiles and horse-drawn carriages, the automobiles supplying much the larger number of the drawings. There were 152 of the smaller drawings spread out on the tables, fully one-half being working drawings made to scale, the rest illustrating problems in development of surfaces, etc.

A pleasing feature was the group of drawings in prospective in color, mainly automobiles. They compared well with any similar work here or elsewhere both as to design and harmony of coloring.

The graduates this season numbered eleven, seven from the day, four from the evening class. The names of the graduates are: J. L. Hardy, E. G. Griese, Geo. H. Dunkley, E. J. Luce, Geo. Barron, Joseph Stolfi, Julius Chordas, A. P. Fletcher, Wm. Whitby, Chas. Gerry, Louis Hertzog.

The average age of the graduating class was 25¾ years. As two of the pupils were 38 and 34 respectively, the average was higher than normal, probably.

All the boys were drawn from the body-making craft except two. Interesting in this connection is the incident of one of the pupils leaving a good out-of-town job, paying 45 cents an hour, and fetching his wife and two kids to town so he could avail himself of this superior instruction.

Another was sent at his employer's expense, his salary continuing during the term just as if he was at work. This was from an automobile factory in Cleveland that appreciated the worth of technical instruction such as could be procured in the school.

Still another interesting incident is that of a former pupil, Mr. L. Hardy, who says he was receiving 32½ cents an hour before he took up the course, and he now receives 45 cents an hour, and does not work so hard as before.

A very decided advantage enjoyed by pupils in the day class is the opportunity to avail of the night classes conducted by the Mechanics Institute on the other floors of the building, that are so varied in their practical applications that they constitute a liberal trade education. Over 2,000 pupils enjoy these opportunities year by year and there is always a waiting list.

The attendance for the season averaged 84½ per cent. of time, and since 1892 the average has been 85.68 per cent. This tells the story of enthusiastic application perfectly.

The increase of pupils year by year is a steady one. It is a fine thing to find employers so well disposed toward the school, and so well impressed with its benefits to pupils that it is not unusual for them to send on and maintain the young men during the term at the expense of the sender. We have just mentioned one instance; still another came from Canada.

In addition to the class work the school conducts a Correspondence Department, open the year round, that makes it easy for the stay-at-homes to get the good that flows from Professor Johnson's services. He can always be addressed on this and on all school matters by writing to Andrew F. Johnson, 21 W. 44th street, New York City.

The graduating class conspired to tempt Instructor Johnson to a dinner on April 4 at Shanley's, a swell Broadway place, and there they presented him with a very pretty silver loving cup, suitably inscribed.

Those who only know of the Technical School supported by the contributions of members of the C. B. N. A. and some few enthusiastic automobile makers, cannot fully appreciate the great work the school is doing in the interest of technical education.

The school holds up its head among the schools of the world of the same kind, but it does not receive, at home, the esteem and support that is its due, good as the present support is. It is an honor to the trade and an ornament to the association, and if Mr. Johnson was not such an uncompromisingly modest man we would like to write how much of it is due to his faithful service and love for the work.

TWO-CYCLE MOTOR RUNS ON VARIOUS FUELS

One of the most recent efforts made to eliminate the faults of the conventional type of two-cycle motor without losing the advantage of simplicity is manufactured by the Superior Motor Co., the first of which has been undergoing demonstration. There are no more moving parts than in the common two-cycle motor, but the piston is of the two-diameter type, as is also the cylinder, and the ports and transfer passages are arranged in an unusual way.

Apart from simplicity, there are several advantages. The method of handling the gas makes back-firing impossible, and there is no crank-case compression and, consequently, no possibility of crank-case explosions. Side thrust per square inch of piston surface is very low because of the length and the large bearing area of the pistons.

The engine is built in units of two cylinders for the reason that the lower piston of one cylinder pumps the charge for the working or upper chamber of the other cylinder. The working cylinder has the usual intake and exhaust ports uncovered by the piston, but the intake port is connected with the pumping chamber of the other cylinder. Each cylinder has its own intake pipe and its own carburetor. The exhaust pipe and port are of the usual kind.

The two pistons of a pair of cylinders are set opposite, one being at the top of its stroke while the other is at the bottom. On the down stroke a partial vacuum is formed in both working and pumping chambers. Near the bottom of the stroke the port at the bottom of the pumping chamber is uncovered by the piston and a charge from the carburetor rushes in to fill the void. At the same time the ports in the working cylinder are uncovered, a new charge taken in and the exhaust discharged. On the up-stroke the working piston compresses its charge in the usual way; the pumping piston compresses a charge of fresh gas, and when the working piston of the other cylinder uncovers its intake port this charge rushes in.

No check valves are required because the ports are all controlled by the pistons. The two cylinders, in the case of a double-cylinder motor, are enclosed in a common water jacket of large capacity. As is the case in four-cycle motors, the crank case serves merely as a support for the bearings and a housing for the cranks; the motor could be built with an open base.

In operation the engine apparently is able to use as fuel gasoline, half gasoline and half kerosene, pure kerosene or denatured alcohol, and its flexibility and power on all of these fuels varies so slightly as to be scarcely appreciable. Running on an electric dynamometer brake, in a recent test in Detroit, all of these fuels were fed through the standard carburetor one after the other, the engine being permitted to cool—cold running water passed through the jacket continually—between each. A single squirt of gasoline injected through the petcocks sufficed to give the initial explosion, after which any of the fuels apparently gave the same power and efficiency.

SPECIAL FLOOD DAMAGE REPORTS

Correspondents of The Hub in the Affected Sections Have Promptly Responded to Inquiries for Information That Will Be Received by Friends and Sympathizers as the Really True Accounts—On the Whole, Damage Not So Severe Among Manufacturers in Our Line As Was Feared or Anticipated

The following answers from the trade are compiled and presented up to the hour of going to press. This information will be more to the purpose than any general accounts:

The Bentel & Margedant Co., Hamilton, O.—Our loss $20,000. Shop and office in 12 feet of water. All patterns saved and shop intact. Are cleaning up and now ready for orders, which will have our best attention, and will be appreciated.

The Zwick & Greenwald Wheel Co., Dayton, O.—Our factory situated at the corner of Linden and Huffman avenues, was not in the flood district. Dayton has had a terrible flood, but our location is high, and we, therefore, escaped entirely. All orders will be taken care of promptly. We are indeed very grateful, and wish to thank our friends for the many inquiries regarding our condition, and also the kind expressions of sympathy for the sufferers of our city.

Buob & Scheu, Cincinnati.—We were not affected by the recent floods. Glad to inform you that we are working our full force every day. The only trouble we have had in the last few days has been in shipping, as the railroads refuse to take freight. Everything is satisfactory now and things are moving on nicely. We are satisfied there will be no more delays in making shipment from this point.

The Sidney Mfg. Co., Sidney, O.—We suffered no loss whatever by the recent floods. Although hard hit in portions of the residence districts, our manufacturers escaped having water in their plants, with the exception of three or four, and the loss to them was comparatively trifling. We were forced to practically shut down for five days during the flood, owing to some of our help being amongst the sufferers, and the excitement due to a calamity of this kind. We are endeavoring to gain the lost time of our shut down by operating at night. Allow us to congratulate you in pursuing the right course in obtaining facts direct from headquarters for your publication.

The Tucker Wood Work Co., Sidney, O.—Thanking you for your friendly inquiry of the 8th, we are pleased to advise that we have suffered no damage from the terrible flood which recently devastated this section of our state.

Columbus Bolt Works, Columbus, O.—We are very happy to say that we did not suffer to any extent from the flood. We were inconvenienced through lack of power for a few days, but were able to resume in full on April 1; in fact, very few of the Columbus factories suffered, the damage being confined chiefly to our west side residence section.

The Union City Wheel Co., Union City, Ind.—We were not bothered with the high waters.

Backstay Machine & Leather Co., Union City, Ind.—We take pleasure to inform you that owing to Union City being the highest point in Indiana, we for this reason escaped the floods.

Muncie Wheel Company, Muncie, Ind.—We enclose you under separate cover copy of our little booklet, "Fire and Flood," which will answer your question about as well as anything we could say. Our plant escaped all injury.

The Franklin Wheel Co., Franklin, O.—Beg to advise that we have not been seriously damaged by the recent flood. Our plant was shut down for several days, but we are in full operation again and our greatest diffculty is the want of railroad facilities for making shipment of the wheels we are turning out. We are in position to fill orders with our usual promptness.

The Peters & Herron Dash Co., Columbus, O.—We were quite seriously hurt by the flood, but are now cleaning up our plant and expect to have the wheels running again next week (April 14), as the job of cleaning up was not as large as expected, although it was bad enough. Would like to have our customers know about this, and anything you can do to spread this news will be appreciated.

The Excelsior Seat Co., Columbus, O.—We were not seriously damaged by the high water of a few weeks ago. We had considerable water in our basement and all around the plant, but outside of the expense of cleaning up and replacing a few wood pulleys, our damage was very small. Our factory was closed down for two weeks, but we are now running as usual and have everything going in good shape and are prepared to take care of any business that is placed with us.

The Lowe Bros. Co., Dayton, O.—The factory was flooded in the first floor and basement. Its losses were largely in raw materials and in its executive offices. Its manufacturing departments, its records, files, etc., were all above high water mark. There was no loss of life among its people, though many of them had thrilling experiences and lost their homes and all their possessions. As the company's loss was largely in raw materials, these are being replaced as rapidly as the freight can carry them. The business will go on as usual with only a slight interruption. The company was one of the more fortunate ones of the city in which such great damage was done. The business men of the entire city are uniting enthusiastically to rebuild and reestablish themselves.

The Andrew Kimble Co., Zanesville, O.—Our factory and yards were high and dry, and the only way we were affected by the flood was through the loss of a week's time. This time was lost owing to the fact that a good portion of our men were

in the flooded districts or beyond, and could not get to the factory. We resumed operations April 1, and have been running with a full force continuously since.

The Victor Rubber Co., Springfield, O.—With reference to the flood conditions in Springfield: The water in this vicinity was higher than it has been for a very great many years. The only sections that were flooded are the sections that have been heretofore flooded nearly every year, but the area of the flooded district was a great deal larger this year than before. There were very few serious losses in Springfield from the flood except the railroads which suffered much more severely than they ever have before. Our factory is located on high ground and we had no flood trouble. Transportation facilities, however, have been almost completely demoralized for the last two weeks and this has caused us a great deal of inconvenience. At this date, however, the railroads are rapidly beginning to get their trains and some freight through.

Parry Mfg. Co., Indianapolis, Ind.—This company was inconvenienced quite a little by the high water and suffered some loss of raw material which consisted principally of lumber from our yards. However, everything is running in good shape now and we are working night and day to catch up with orders that were delayed for a few days by our inconvenience.

The Zanesville Gear Wood Co., Zanesville, O.—We are very glad to say that our factory, being situated in South Zanesville, a suburb, was not in the flood district. We lost but two days, yet we are working with a crippled force, as several of our boys were flood sufferers and of necessity are losing some time. We are able to fill orders as usual. This happened at a season of the year when we are usually rushed and this year was no exception as we are making more gearwood than we have for several years. The property loss to Zanesville has been tremendous and do not believe that current reports have been misrepresented. Our people will surely need aid for some time to come.

The Mitchell Wheel Co., Miamisburg, O.—We were hard hit. We are very fortunate, however, in having an abundance of stock that was not touched by the water, and consequently as soon as we could get cleaned up were in shape to begin making wheels, and outside of the slight delay we will be able to take care of our customers just as if nothing had happened.

The Dayton Malleable Iron Co., Dayton, O.—We enclose circular letter of April 1 which was sent out to our customers. Since issuing this letter our force of men that were put upon the city streets have cleaned the section assigned to them and we are beginning operations in our plant. The railroad bridge across the Miama river has been replaced by a substantial temporary structure and freight is being received by the Pennsylvania Railroad. We are therefore making freight shipments on our orders, but have been limited to express shipments during the past week. The flood came to our very doorway, but we were not damaged by either flood or fire. While our pecuniary loss to plant will be practically nothing, the loss of trade and annoyance among our customers is something that concerns us very deeply. The letters we have received from many of them show a very sympathetic spirit and in view of the widespread extent of the disaster, no other view can be taken of it by anyone who thoroughly understands the situation. The circular follows: "Dayton has suffered the most disastrous flood in its history, which has rendered 70,000 people homeless and put out of commission almost every manufacturing plant in the city. Fortunately our plant is on the outer edge of the submerged district and did not suffer serious damage from either fire or water. We would be in position to resume operations now were it not for the fact that the federal authorities have taken complete charge and impressed into service the men from all factories in the town for the purpose of cleaning up the entire city. Our plant will therefore necessarily remain closed until such time as the government finishes this work and releases our men. Of course, considering circumstances, it is an impossibility to state definitely when conditions will allow a complete resumption of business, but we believe that after the expiration of a couple of weeks the task of cleaning up will have been completed and we will be able to resume operations. Railroad service has been seriously crippled, but we will begin shipments just as soon as the railroads will receive freight for transportation."

The plant of the Columbia Carriage Works, at Hamilton, O., collapsed from the effects of the flood on March 25.

The rising of the waters at Akron, O., caused the Goodyear Tire & Rubber Co., the Buckeye Rubber Co., and the local branch of the Kelly-Springfield Rubber Co. to suspend operations for a few days, the water having reached their engine rooms. The water stopped the first in the power house of the N. O. T. & L. Co., so that the city was without car service and in darkness for two days and a night. Over half the bridges and culverts in the county were washed away, and for a short time railroad and street car service to all outside towns was suspended. The large reservoirs which supply the rubber plants, with the exception of the Big Reservoir, remained intact, and the Big Reservoir, on account of an overflow at one of its feeders, was lowered about nine feet.

The Nyberg Automobile Works, in Anderson, were inundated to a depth of five feet, but it is estimated that the damage done will not exceed $1,500, including the clearing out of the mud and cleansing the machinery. The Remy Electric Co.'s plant, also in Anderson, was hard hit, not so much by the flood as by the disabling of the municipal electric power plant which furnished the Remy power, and the submersion of which brought the Remy works to a standstill. By connecting an automobile engine with a big generator, and resorting to other emergencies of the sort, however, the Remy factory was able to resume operations in a comparatively short time.

In Peru, the water reached the plants of both the Great Western Automobile Co. and the Brown Commercial Car Co., but did not reach above the first floor and the damage is not what may be termed serious. Both factories have resumed work. In the Brown factory, the damage was minimized by the fact that the planking on the first floor, although nailed together, had not been nailed to the supports; as a result it floated as the water arose, carrying the factory contents with it much like an indoor raft.

In Elyria, Ohio, the basement of the Garford factory was flooded, but only wheels and minor parts were touched by water. The damage was small.

In Dayton, Ohio, the Maxwell factories, of which there are two in Dayton, removal of the cars to the second floor saved most of them.

The damage to the Dayton Electrical Laboratories Co., which supplies the Delco starting and lighting system to five prominent car manufacturers outside of the flooded district, caused more or less inconvenience.

The damage to the Apple Electric Co. was confined to the machine shop and battery department and both have been cleaned up.

The factory of the Dayton Airless Tire Co. and the Dayton Air Friction Carburetor Co. sustained damage, but not serious.

In Indianapolis, the Nordyke & Marmon factory was but two square removed from the levee which broke and flooded certain parts of the city, but before the water reached the Marmon plant and partially submerged the first floor sufficient

warning had been given to permit the removal to the second floor of most of the finished and unfinished cars and assembled units and patterns.

The Marion and Pathfinder factories also were submerged, but in both cases it was possible to remove the number of finished cars and other important work before the danger became acute. In each case, immediately the water receded a repair force was put to work.

The Empire plant also felt the water and was somewhat discommoded, but as it has another plant in Connersville, Ind., its inconvenience did not prove serious.

The Showalter building collapsed, carrying with it about ten chassis to which limousine bodies were being fitted, while the Irvin Co., which was probably the heaviest loser, suffered the loss of a large number of body frames which were so long submerged and so badly warped that they cannot be repaired.

The National, Premier, Cole, Henderson, American, Stutz, Waverley, Prest-O-Lite, G. & J. and Schebler factories in Indianapolis are all located on high ground and escaped wetting.

The Knippensburg carriage factory at Laurenceburg, Ind., was destroyed by fire March 30. The city at the time was inundated. During the fire, the factory buildings were torn from their foundations and carried about five squares, by which time the buildings had burned to the water's edge.

At Columbus, O., the flood loss sustained by the Columbus Buggy Co. will not be as great as first supposed. According to C. D. Firestone, the company will have the greatest damage on the woodwork that goes into the bodies of the gas and electric machines. The first floor had four feet of water on it. Raw material was stored on this floor, such as iron castings and a few motors that were to be set in new automobiles. The materials have been soaked in oil and should not be damaged. Twenty-five motors were on the floor and they probably will be a total loss. Mr. Firestone said all of the books were safely stored away. Two hundred men were set to work cleaning up the damaged floor. The plant has resumed operations.

A NEW CABRIOLET HOOD FASTENER

The cabriolet is admittedly one of the most difficult of the motor carriage bodies to make and complete in a satisfactory manner. In addition, as the whole of the hood has to be folded within a small compass at the rear, the weight is concentrated and great stress is put upon the hinges and fastenings at that point. The Regent Carriage Co. has just designed a new type of cabriolet body, a sketch of which is illustrated, showing a very large rear glass light upon the most recent limousine lines. The apparatus for folding the canopy and roof is of a very ingenious design, and the hood is folded within a very small compass with the minimum of overhang. The hood can be raised or lowered without difficulty, the only pieces left standing being the two front pillars, which fold across the top of the front cross rail behind the driver's seat. There are only two points to be disengaged on opening the hood; they are automatic in action when closing the hood.

A separate illustration is given of this new locking device. The general manager of the combined firms of the Regent Carriage Co. and Rothschild et Fils (London) has introduced several anti-rattling devices for doors and windows, and this is one of the latest. The objection to these spring catches has been that when worn they must be replaced by new, and as the tendency to rattle is great the renewals are frequent. In this case the necessity for renewal has been done away with. Into a heavy bronze boss plate a steel acorn-headed bolt is screwed; needless to say the fit is very accurate and requires a special tool to secure it; this bolt has the inner side of the head undercut and the lip of the spring-held catch dips down into this special part. Should any wear arise the bolt can be screwed further home. The bolt can be adjusted to a nicety, and thus there is no fear of these parts rattling after a short time of service. The doors are fitted with heavy locks and adjustable dovetails.

100 PARCEL POST AUTOS

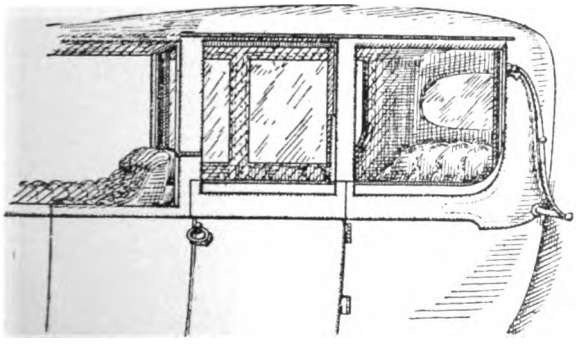
The Post Office Department has ordered for delivery in various parts of the country one hundred automobiles to be used in parcel post delivery. Here is a list of the purchases:

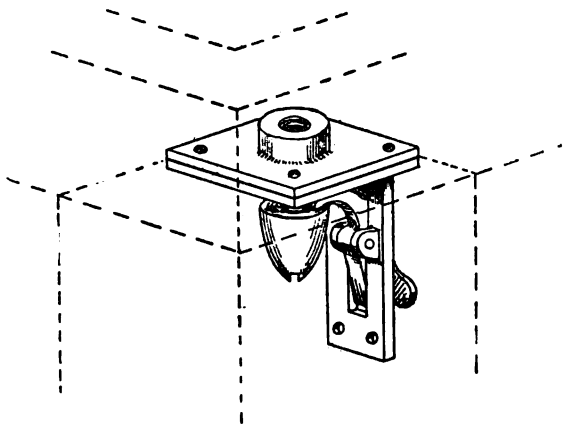
The White Co., New York, five White cars, 1,500 pounds, $2,000 each; Stewart Motor Corp., Buffalo, ten Stewarts, model F, 1,500 pounds, $1,440 each; Kissel Motor Car Co., Washington, ten Kissel cars, 1,500 pounds, $1,350 each; Durant-Dort Carriage Co., Flint, Mich., ten model C, 1,600 pounds, $1,225 each; Louis J. Bergdoll Motor Co., Philadelphia, ten Bergdoll 30 delivery cars, 1,500 pounds, $1,240 each; Atterbury Motor Car Co., Buffalo, ten model A, 1,500 pounds, $1,323 each; the Willys-Overland Co., Toledo, ten model 69 delivery special, 900 pounds, $1,000 each; Studebaker Corp. of America, Detroit, five model 20 delivery wagons, 750 to 1,000 opunds, $755; Prest-O-Lite tank, $25 extra; C. B. B. Motor Car Co., Washington, ten Modern model B, 1,000 pounds, $1,270 each; Waverley Co., Indianapolis, five machines, 1,000 pounds, $1,739 each; Kentucky Wagon Mfg. Co., Louisville, five model 10 Urban, 1,000 pounds, $1793 each; Ward Motor Vehicle Co., New York, five commercial type EA, 1,000 pounds, $1,975 each; Baker Motor Vehicle Co., Cleveland, five model H, 1,000 pounds, $2,000 each.

AKRON LABOR AGITATORS ACKNOWLEDGE DEFEAT

The strike of the Akron rubber workers has been officially declared off by the imported labor agitators who brought it about.

The Weed Chain Tire Grip Co. has enjoined the Whittaker Chain Tread Co. and the E-Z-On Chain Tire Protector Co. on claim of infringement of Weed patent.





The new cabriolet hood fastener designed by the Regent Carriage Co. The adjustable thimble catch is shown on the right.

Trade News From Near and Far

BUSINESS CHANGES

The LaCrosse (Wis.) Carriage Co. has filed notice of dissolution.

A. P. Jensen bought out Mr. Hendrick's wagon shop at Fairmont, Minn.

Wm. Cofey has purchased the business of J. C. Jordon, in Rushville, Neb.

J. E. Elliott has purchased the business of the Brown Auto Co., in Geneva, Neb.

C. Haas has been succeeded in the vehicle business in Lester, Ia., by O. W. Gronsdahl.

R. H. Thesing has purchased the stock of vehicles, etc., of Alex. Scott, in Polk, Neb.

Ed. Ellison has purchased the stock of vehicles, etc., of H. T. Spillers, in Otterville, Mo.

Trueblood & Son have purchased the stock of vehicles, etc., of A. J. Roe, in Hooper, Neb.

The Bode Wagon Co., of Cincinnati, has had its capitalization reduced from $75,000 to $10,000.

R. A. Morris, of Augusta, Kas., has purchased the business of Ibach & Co., in Douglas, Kas.

Wm. Conrad has purchased the vehicle business of Leach & Halderman, in Long Island, Kas.

Hawley Bros. have sold out their stock of vehicles, etc., in McPherson, Kas., to G. B. Kline.

John P. Wood has disposed of his stock of buggies, etc., in Butte, Neb., to Casper Englehaupt.

Wm. Wink has purchased the stock of vehicles, etc., of Connelly & Connelly, in Creston, Neb.

Anderson & Halin have succeeded to the business of the Boone Carriage Works, in Boone, Ia.

J. W. Fox & Son have purchased the Dell Holderman stock of vehicles, etc., in Davenport, Wash.

C. W. Kelley has disposed of his stock of buggies, etc., in Valley Falls, Kas., to J. G. Adamson.

L. J. Riley, of Haxtun, Colo., has purchased the vehicle business of W. E. Whittier, in Gothenburg, Ia.

Edw. Ayres has disposed of his buggy and implement business in Alexandria, Neb., to John Reinholtz.

F. L. Reeder has been succeeded in the vehicle business in Broken Bow, Neb., by Rockwell & Johnson.

Fred Brehm has disposed of an interest in his vehicle and implement business in Litton, Ia., to Chris. Arndt.

Tusch, Aleombreck & Frost have purchased the stock of vehicles, etc., of Fish & Stockdale, in Wayland, Mich.

Benjamin A. Harrington has bought the Albert R. Stone carriage shop and land of A. G. Williams, at Barre, Mass.

L. O. Rud, senior member of the Rud Wagon Mfg. Co., of Lansing, Ia., has retired from the company and is succeeded by his son, Odin Rud. The Moe brothers, also former members of the company, will engage in other pursuits. This corporation has been in existence since 1870.

NEW FIRMS AND INCORPORATIONS

The Hackney Buggy Co. is about to erect a factory in Wilson, N. C.

The Bowden Carriage Co. has been incorporated in Texarkana, Tex.

E. W. Dexter is about to open a new stock of vehicles in Irving, Kas.

A. D. Watson is soon to open a stock of buggies, etc., in Vinita, Okla.

Bruster Bros. are about to put in a line of vehicles, etc., in Swinton, Mo.

C. M. McNulty is about to open a stock of vehicles, etc., in Ordway, Colo.

Carlton & Son, of Strang, Okla., are adding a line of wagons and implements.

Thompson & Ames have opened a new stock of vehicles, etc., in Acampo, Cal.

E. Lervig is engaging in the vehicle and implement business in Elwood, Neb.

Gayde & Fisher, of Plymouth, Mich., are engaging in the vehicle business.

The Plummer Co. has opened a stock of vehicles and hardware in Marianna, Ark.

A. Glockner, of Ceres, Cal., is opening a new stock of vehicles, etc., in Sandy, Ore.

Parks & Berry have engaged in the vehicle and hardware business in Prague, Okla.

G. W. Calkins and W. A. Neeley are engaging in the vehicle business in Greenfield, Ia.

H. Henrickson has just opened in the vehicle and implement business in Cordova, Neb.

J. L. Bachman has purchased the stock of carriages, etc., of C. O. Hale, at Sprague, Neb.

J. H. Ellis has just engaged in the carriage and implement business in Phillipsburg, Kas.

Howard J. Brown is about to open a stock of implements, vehicles, etc., in Hannibal, Mo.

Wm. Edwards is about to open a stock of buggies and implements in Bower Mills, Mo.

W. A. German has begun the erection of a new vehicle and implement store in Blencoe, Ia.

Harvey & Sawtell, of Alpine, Mich., are about to open a stock of buggies, etc., in Pierson, Mich.

The hardware firm of Van Genderson & Lubberden, in Sully, Ia., has decided to add carriages.

The Texas Implement & Carriage Co. is about to engage in the vehicle business in Itasca, Tex.

The Dallas (Tex.) Vehicle Co. has been incorporated with $6,200 capital, by J. G. Shaffel, R. M. Irvin & W. O. Irvin.

The Archbald Wheel Co., of Lawrence, Mass., was recently organized, the wheel business of the Archbald-Guilford Co. and the New Haven Carriage Co. being taken over.

The Gustav Schaefer Wagon Co., Cleveland; wagons, vehicles, automobile bodies, etc.; $55,000. Gustav Schaefer, Henry C. Schaefer, Ernest Schaefer, Chas. E. Moritz, Arthur Kruse, Anna M. Schaefer.

The F. & H. Wire Wheel Co., Columbus, O., to manufacture and deal in wire wheels and accessories; $25,000; L. A. Frayer, Charles O. Howard, W. K. Wissinger, Charles S. Hamilton and E. R. Sharp, Jr.

IMPROVEMENTS AND EXTENSIONS

McKinney & Brown are soon to begin the erection of a vehicle repository in Baldwin, Kas.

The Washington Buggy Co. is about to build an addition to its plant in Washington, N. C.

The Fort Smith Wagon Co., of Camden, Ark., is about to establish a plant in Waldo, Ark.

The Tyson & Jones Buggy Co. is about to erect an automobile repair shop in Carthage, N. C.

Bert Johnson is about to erect a building for his vehicle and implement business in Granite Falls, Minn.

The Thornhill Wagon Co., of Lynchburg, Va., has increased its capital stock from $300,000 to $1,000,000.

Dugger & Goshorn Co., manufacturers of wagon stock at Memphis, Tenn., has increased its capital from $30,000 to $100,000.

The Welsh Carriage & Implement Co., New Orleans, La., has put up a new building to be used as an implement and carriage warehouse.

The Durham (N. C.) Buggy Co. has increased its capital stock to $160,000.

Edwin Smith has torn down part of his wheelwright shop at Gardenville, Pa., and will rebuild and improve it.

The Herring Buggy Co., Mansfield, O., has purchased the ruins of a building recently destroyed by fire and will erect a two-story brick, modern in every respect, for a garage and salesroom.

Dunbar Bros., carriage and buggy dealers at Spartansburg, S. C., have begun work on a new warehouse back of their present place of business. It will be a two-story brick building, 36x40 feet, with a basement, and will cost something like $2,000. They will move into the new building in the autumn.

FIRES

The Janesville (Wis.) Carriage Co. sustained damage by fire.

The Oxford (N. C.) Buggy Co. suffered a $20,000 fire loss on March 18.

The stock of buggies, etc., of Belcher & Belcher, York, Neb., has been destroyed by fire.

Christian's paint and carriage shop at Franklin, Tenn., was destroyed by fire March 14.

The Sturm & Mattoon carriage factory at St. Paris, O., was destroyed by fire on March 17.

The Black Bros. carriage factory, Cleveland, O., sustained a $25,000 fire loss on March 18.

The factory of the Cope Company, vehicle manufacturers in South Orange, N. J., was destroyed by fire April 2. The damage was $35,000.

Fire, March 20, damaged the plant of Alexander Wolfington's Son, 8-14 North Twentieth street, Philadelphia, to the extent of several thousands of dollars.

NEWS OF THE AUTO TRADE

Herbert Jones has been appointed receiver of the Clark Motor Co., at Shelbyville, Ind.

The King Motor Car Co. has been incorporated at Detroit with a capital of $20,000.

The Admiral Motor Co. has been incoroprated at St. Louis, Mich., with a capital of $50,000.

The Palace Auto Co. has been incorporated in Webb City, Mo., with a capital stock of $24,000.

The Monarch Motor Car Co. has engaged in business in Detroit, Mich., with a capital of $30,000.

The John Berry Automobile Co. has been incorporated in St. Louis, Mo., with a capital of $20,000.

The Hastings Motor Shaft Co., of Jackson, Mich., has been succeeded by the Jackson Motor Shaft Co.

The Arby Automobile Co. has been incorporated in Mt. Pleasant, S. C., with a capital stock of $200,000.

The Waynesboro Automobile Co. has been incorporated in Waynesboro, Va., with a capital stock of $15,000.

The Jarvis-Huntington Automobile Co. has been incorporated in Huntington, W. Va., with a capital stock of $100,000.

The Gibson Motor Car Co. has been incorporated at Pittsburgh, Pa., for $3,000,000 by J. H. Mahoney and others.

The Lewis Motor and Engineering Co., of Detroit, Mich., is about to take over the Amplex automobile plant in Mishawaka and will again open the factory. The plant was formerly operated by the Simplex Motor Car Co., composed of Mishawaka men, but has been closed for the last several months. The company made a specialty of racing cars.

WILL CELEBRATE SILVER ANNIVERSARY

The directors of the Western Retail Implement and Vehicle Dealers' Association held their spring meeting at Kansas City, March 25 and 26. Plans were laid for the next convention, which will be held in January 1914, when the silver anniversary of the association will be celebrated.

The board discussed the bulk sales law and modified to some extent the attitude of the association as taken at the last convention. During the meeting at Kansas City in January the association went on record in opposition to bulk sales laws. At that time bills were pending both in Kansas and Missouri legislatures. Since then the Missouri bill has been passed and the Kansas bill defeated. The directors adopted the following resolution:

"It is the sense of the board of directors of the Western Retail Implement and Vehicle Dealers' Association that they would at any time welcome the appointment of a conference committee with a view to framing a bulk sales law equitable to the retail dealers, jobbers and manufacturers."

STUDEBAKER COMPANIES REDUCE CAPITAL

Having been absorbed more than a year ago by the Studebaker Corporation, the capital stock of the Studebaker Bros. Mfg. Co. and the Studebaker Automobile Co., of South Bend, Ind., has been reduced to nominal sums of $1,000 each. The former capitalization of the Studebaker Bros. Co. was $5,100,000, while the capitalization of the Studebaker Automobile Co. amounted to $100,000.

SCHILDWACHTER CARRIAGE CO. FAILS

The Schildwachter Carriage Co., manufacturer of carriages and automobile bodies at 1885 Park avenue, New York City, filed a petition in bankruptcy March 10, with liabilities of $36,486 and assets of $23,583. C. W. Schildwachter is president. Philip J. Schildwachter, the treasurer, died on January 17. The business was started in 1865 and was incorporated in June, 1903, with $50,000 capital stock.

MOTSINGER HURT IN COLLISION

Homer N. Motsinger, president and general manager of the Motsinger Devices Mfg. Co., of Lafayette, Ind., was badly hurt in a collision with a street car, in that city, on Saturday evening, April 5. The automobile he was driving was demolished and he was thrown on his head, sustaining injuries which it was feared would result fatally.

GOODYEAR ORGANIZES BRITISH COMPANY

Goodyear interests have organized the Goodyear Tire & Rubber Co., Ltd., under British laws, which has established itself in Central House, Kingsway, London. The British company will control the Goodyear business throughout the world, North and South America excepted.

END-GATE FACTORY

Gainesville, Tex., is to have a factory which will turn out nothing but end-gates to wagons. The capacity will be large enough to supply three or four different wagon factories. The factory will be owned by Nichols & Whaley. Mr. Nichols is the patentee of the end-gate.

OBITUARY

Wilbur S. Gamage, 56, proprietor of the Coolidge Carriage Co., of Woodville, and treasurer and controlling member of the J. W. Sargent & Son Co., Worcester, Mass., died at the Worcester City Hospital, March 14, of peritonitis, following an operation for strangulated hernia. In his younger days he worked for L. E. Coolidge, the carriage maker, in Woodville, and when he died, Mr. Gamage continued the business. Mr. Gamage is survived by a wife and one sister.

Wm. H. Murphy, 71, for many years conducting a large wagon manufacturing works at Farmington, Del., died February 4, of acute indigestion.

Nathaniel C. Spence, 70, for many years engaged in the carriage manufacturing business at Atlanta, Ga., died March 15, in a private sanitorium. He had been retired from active business for several years. He is survived by his widow, three sons and three daughters.

Walter W. Hurst, traveling salesman for the Troy (O.) Wagon Works, dropped dead of heart disease in a hotel in Fond du Lac, Wis., on March 12.

Gottlieb C. Mick, for many years engaged in carriage and wagon building at Merchantville, N. J., died March 4 after a long illness. He was born in Philadelphia, but moved to New Jersey when a boy, and later succeeded his father in business. He was prominent in local politics and had served as postmaster of Merchantville during Cleveland's administration. He is survived by his widow and six grown children.

Michael Kilroy, who for many years conducted a carriage factory in one of the suburbs of Baltimore, Md., died March 17. Of late years he had been connected with a northern buggy company in the capacity of traveling salesman.

Lewis C. Kleinhans met accidental death while walking on the tracks of the Central Railroad Co. of New Jersey, on February 18. Mr. Kleinhans was born in New York City in 1877, but lived in Newark, N. J., since he was two years of age. He graduated from Princeton college in 1900, and upon entry into his business career he assumed the position of secretary of Chas. Cooper & Co., chemical works at Newark, N. J. About a year later he was made manager and vice-president of the Keratol Co., a subsidiary concern which manufactures artificial leather. His widow and three children survive. Hugo L. Kleinhans, a brother of the deceased, succeeds him as manager of the Keratol Co.

SOMETHING ABOUT ALUMINUM

A subscriber writes to ask answers to the following questions:

How is the lower panel shaped to the frame work on special automobile body work having turn under side and rear?

Are not the corner panels hammered to shape, and the edges screwed or nailed to pillars?

And the side and rear panels fastened to same pillars?

And the whole soldered over and finished?

Or is it one continual panel from door to door?

Could good body builders who have only built wood car and limousine bodies do the metal work with the tools found in carriage shops?

It is easy to answer yes and no to most of these questions, but we will go into it in some detail.

The average carriage mechanic is not a sheet metal worker, and at first body makers resisted attempts to make them such. Aluminum sheet is undoubtedly the most uniformly useful for body panels. It is very durable and possesses the happy combination of working easily to any shape, of painting well, and of not rusting.

A body made of wood framing and aluminum panels will be as light as an average wood body and sometimes lighter. For seat work with curved surface, but not in same slant it is best material to use. The dimensions commonly used are 16 guage, about 1/32 inch thick, weighing about 6 oz. to square foot. Sometimes 14 guage is used.

Sheet steel can be used on underbodies and straight parts not needing beating. Steel is cheaper but costs more in labor to apply. If steel is used on straight surfaces 22 guage is about right for bodies. Steel rust is a drawback, so it must be painted quickly on the in and out of panels.

To work up aluminum for seats it is now the practice to form the mouldings solid on the sheet. Trimming rail is fastened at the top, and the panel under seat frame at bottom, doing away with nails and screws on outside surfaces. When necessary to apply mouldings separately to outside of panel a tapered hole is drilled or punched from inner side of moulding outwards. This makes a collar of metal around the hole after nail is driven in and set below surface. The metal forming collar is forced in after the nail and filed smooth. If well done it can't be seen and it is durable.

In beating sheets for forming panels power is generally used. A hammer that will vary up to a 15-pound stroke is used. The sheet is first rough shaped by hand, holding panel on a sand bag and beating with round faced mallet. Corners are formed by drawing with a hammer over an iron fastened to the bench. This drawing consists in working the metal from the middle of the panels toward the lower edge, working under and toward a central point till the lower end has the turnunder shape required. It is a job of kneading with the hammer till the effect is obtained.

If a power hammer is used a frame work for the seat is called for to guide operations and fit the seat to the panel as the work goes on. If a large sheet, wood stays are fastened across to keep the sides together and to control vibrations due to hammering. The light blow of the hammer is said to toughen the metal.

All this work is within the easy handling of any body maker who will learn how to do it by making a beginning on the ground floor.

For developing seat panels that are straight on the sides and back, the metal is run through rolls to bend corners, and sometimes it can be drawn into shape if the amount of work is enough to justify making up cast iron frames to draw over.

The Guthrie (Ky.) Warehouse Company building, occupied by Evans & Son, carriage manufacturers, was destroyed by fire April 5. Approximate loss $15,000, with $2,500 insurance on building and $4,000 on stock. Seventy-five buggies were burned.

Wants

Help and situation wanted advertisements, 1 cent a word; all other advertisements in this department, 5 cents a word; initials and figures count as words. Minimum price, 30 cents for each advertisement.

PATENTS

Patents—H. W. T. Jenner, patent attorney and mechanical expert, 606 F St., Washington, D. C. Established 1883. I make a free examination and report if a patent can be had and exactly what it will cost. Send for circular.

SITUATIONS WANTED

Position Wanted—A man of wide experience and for years superintendent of coach construction and high grade repairs for well known carriage and automobile companies, is open for an engagement with a first class concern. Knows how to manage a business and run a factory on an economical basis. Competent, up-to-date systematizer. Unquestionable references. Would be particularly valuable to a concern in or near New York City. Address, Superintendent, care The Hub, 24 Murray St., N. Y. City.

Carriage and Automobile Supplies—Young man, 27, seeks position. Has had seven years experience in leading German firms. A1 references. Address, A. E. Pasedag, 263 W. 24th St., New York.

PAINTING THE PANEL BODY

There are a good many panel bodies now being used on commercial automobile work, and a few words about painting may be in place.

The running parts, seats, body, etc., are primed before turning them over to the smith, with a primer made up of one part well ground yellow ochre and three parts keg lead ground in oil. Enough of this is added to three parts linseed oil and one part turpentine, to stain liquid medium decidedly; add a tablespoonful of coach japan to each quarter gallon of the mixture. If the under body of the job is a part of the painting, unhang the parts, marking them for identification. Go over everything with No. ½ sand paper lightly, especially upon edges, then beat up some ground white lead to a heavy paste, and if the final color of the job is to be dark add enough lamp black to shade the mixture. Suppose red is to be body color, then Indian red could be used instead of lampblack to warm up the white color. Estimate the amount of oil in the lead and thin it to the right working consistency on the basis of one-fourth raw linseed oil, three-fourths turpentine; apply with a chisel-pointed oval brush and work the coat out clean and smooth. Sixty hours is needed for drying out. Then with hard-drying carriage putty proceed to putty both body and running parts. If any opened grained patches of wood are in evidence draw putty all such with some of this same putty let down a little with turpentine. The 2½ inch glazing knife is good for this work, care being taken to leave no surface material on the surface.

The inside of the body and seats should also be treated. This putty should stand 24 hours in a temperature not less than 60 degrees.

The next step is to roughstuff. Apply a coat every 24 hours until five coats are used. After the first coat inspect the surface carefully and putty up discovered cavities. Over the last coat apply a stain or guide coat made up of roughstuff and yellow ochre to assist the rubbers. After three or four days surface down with rubbing stain, being careful not to scratch or gouge the surface. Avoil also coating edges of mouldings. Upon completion set body aside until the following day for evaporation of moisture. Then run over the surface lightly with No. 0 sandpaper and dust off thoroughly. Then coat body panels and seat panels with japan ground in red thinned down in turpentine, and to the pint of color add a teaspoonful of raw linseed oil. The day following again putty up some medium deep wine color in turpentine with enough to be laid on with camel's hair brush, add a few drops of linseed oil, stir, and apply as a flat color coat.

The final varnishing operation will not be necessary to comment on in this connection.

This is a description of a slow but thorough process of working. We add for the benefit of those who need quick results that are very substantial as well as quick methods also in use. There are "systems" that accomplish the end more quickly that all good varnish makers compound.

TO REORGANIZE HAYWOOD WAGON CO.

Creditors and bondholders of the Haywood Wagon Co., Newark, N. Y., held a meeting at that city on March 22 for the purpose of reorganizing the company. A committee to carry on the scheme of reorganization was appointed, with Peter R. Slaight, of the Arcadia National Bank, of Newark, at its head.

WILL NOT REBUILD

Lee & Porter will not rebuild their axle plant at Dawagiac, Mich., destroyed by fire recently. Instead they will offer for sale the 150 horsepower derived from the dam and may locate the plant elsewhere.

INDEX TO ADVERTISERS

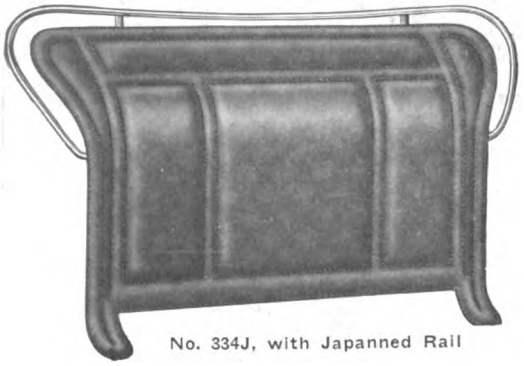
BUSY BUYERS BRIEFS

McKINNON DASH COMPANY

BUFFALO, N. Y.

TROY, OHIO
CINCINNATI, OHIO

ST. CATHARINES, ONTARIO



No. 334J, with Japanned Rail

Japanned Rails

ARE IN GREAT DEMAND

On account of their attractive appearance and durability

"BLACK VELVET" CUSHION SPRINGS

Manufactured Only by the

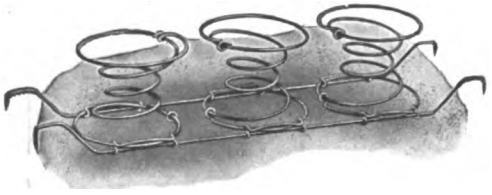
NATIONAL SPRING AND WIRE COMPANY

ALBION, MICH. WINDSOR, ONT.

THE SPRING OF QUALITY.

SPRING or SOFT EDGE CUSHION FRAME

For Buggies or Other Vehicles. Built of the Highest Grade of Steel Wire.



STRIP FOR WOOD OR BOX FRAME

WILLEY'S

COLORS

The RECOGNIZED STANDARD

C. A. WILLEY CO.

COLORS GRINDERS

and Manufacturers of Specialties in

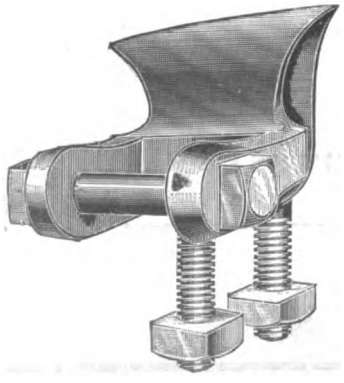
CARRIAGE, AUTOMOBILE AND CAR

PAINTS

COLORS, VARNISHES, ETC.

HUNTER'S POINT, NEW YORK CITY

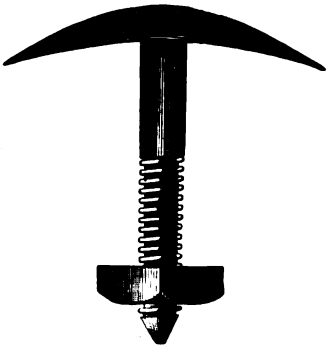
Skewed Shaft Couplings



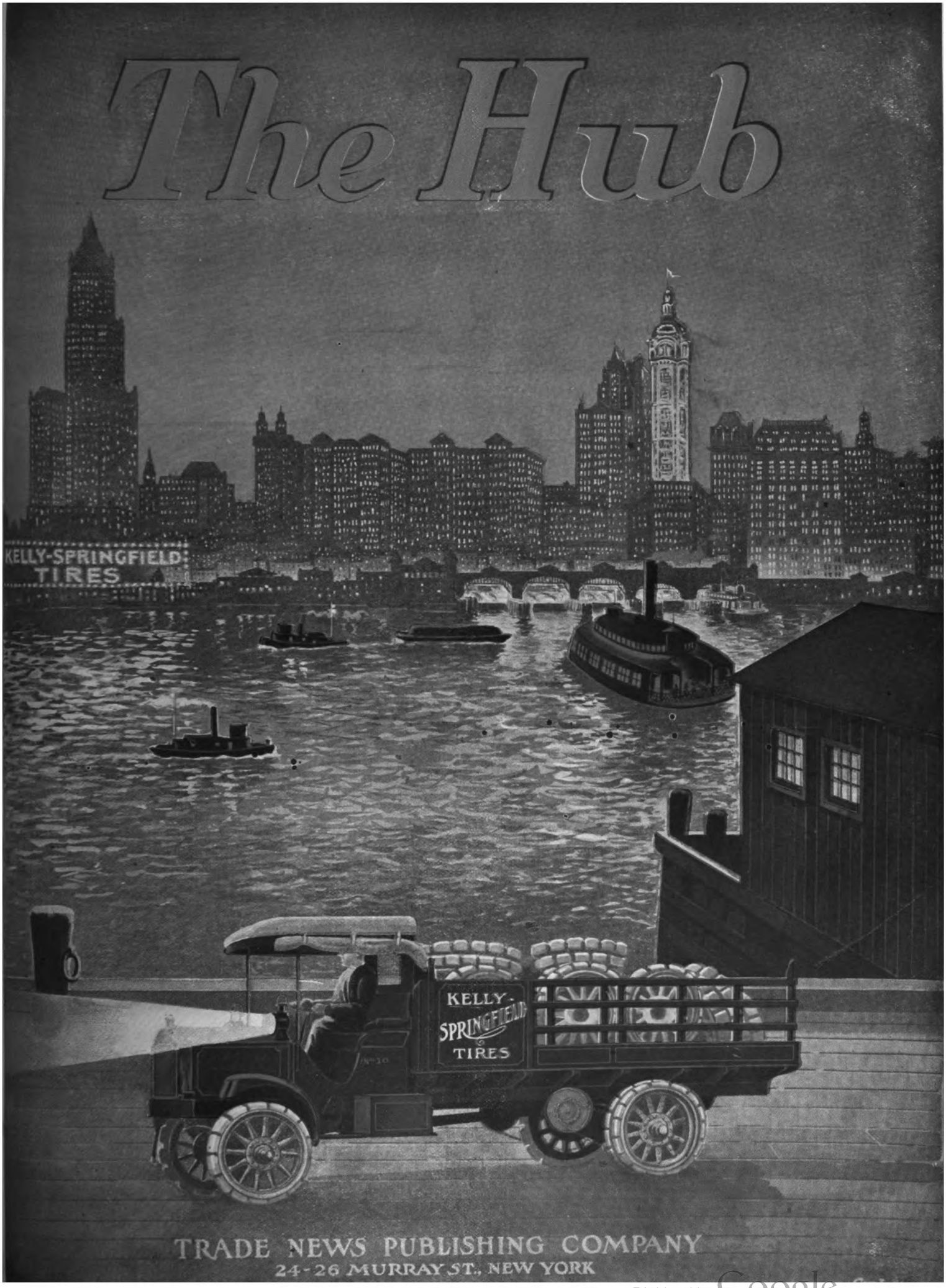
Regular or Oval Patterns
For High Arched Axles

Furnished in rights and lefts for any height of arch. Oval Axle Clips 5/8 or 3/4 width to match Oval Couplings. Bolts, Clips, Couplings, Carriage Hardware and Special Forgings

Catalogue "H" and Prices on Application



COLUMBUS BOLT WORKS, Columbus, O.



Highest Quality Quick Painting

If a quick job of automobile, carriage or wagon painting of **high quality** is required, use

Valentine's Celox Quick System

Note herewith cost and time sheet of this system in the shop of one of our largest customers. Both these systems are in use in this factory—the Celox System for two-thirds of its work. The figures were furnished us by this company and have been carefully verified.

Cost of Labor

Old Style

Lead and oil coat (1 day)	$2.50
Putty up (5 hours)	1.25
Sand off (5 hours)	1.25
Five coats rough stuff (1 day)	2.50
Rub rough stuff (1 day)	2.50
Flat coat (4 hours)	1.00
Color varnish (2½ hours)	.65
Hair off and stripe (½ day)	1.25
Rubbing varnish (2½ hours)	.65
Rub down and finish (8 hours)	2.00
	$15.55

Celox System

Celox Metal or Wood Primer (1½ hours)	$0.40
Putty up (5 hours)	1.25
Two coats Celox Knifing Surfacer (7 hours)	1.75
Sand and Celox Sealer (1 day)	2.50
Vanadium Color Varnish (2½ hours)	.65
Hair off, stripe and Vanadium Quick Finishing (8 hours)	2.00
	$8.55

Drying Time

Lead and oil	(1 coat)	48 hours
Putty up	(1 coat)	1 hour
Rough stuff	(5 coats)	72 hours
Flat color	(4 coats)	6 hours
Color varnish	(1 coat)	48 hours
Clear rubbing	(1 coat)	48 hours
Finishing varnish	(1 coat)	72 hours
		295 hours

Celox Metal or Wood Primer	(1 coat)	24 hours
Putty up	(1 coat)	1 hour
Celox Knifing Surfacer	(2 coats)	12 hours
Celox Sealer	(1 coat)	24 hours
Vanadium Color Varnish	(1 coat)	24 hours
Vanadium Quick Finishing	(1 coat)	16 hours
		101 hours

TRY OUT THIS SYSTEM AT OUR RISK

Sign coupon for Celox Quick System book, and special offer on trial case sufficient for two cars.

Valentine & Company

456 Fourth Ave., New York

343 S. Dearborn St., Chicago

74 Pearl St. Boston

Trade VALENTINE'S VARNISHES Mark

FILL IN—TEAR OFF—MAIL TO-DAY

VALENTINE & COMPANY, 456 Fourth Ave., New York

Name ..... H.C.S.

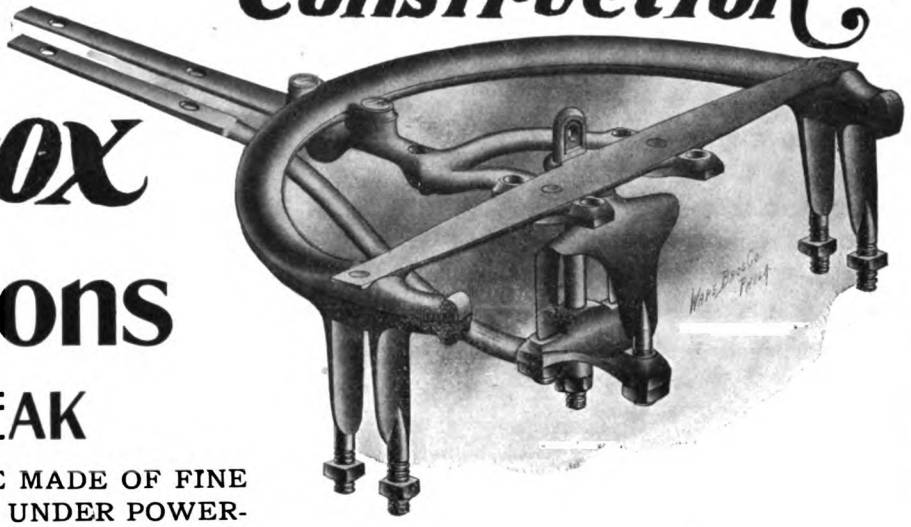
Address .....

.....

Please send me Celox Quick System Booklet and trial case offer.

STRENGTH

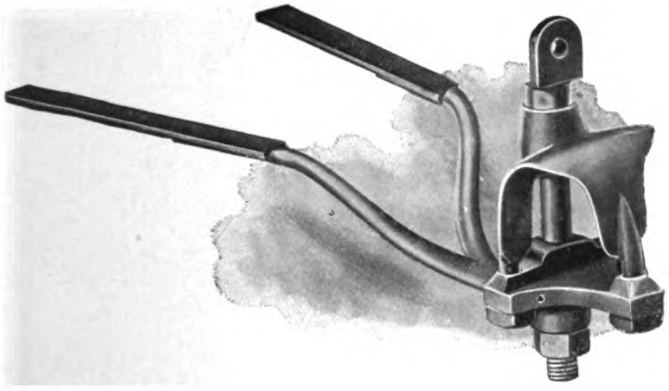
IN Gear Iron Construction



Wilcox Gear Irons

NEVER BREAK

THIS IS BECAUSE THEY'RE MADE OF FINE STEEL AND DROP FORGED UNDER POWERFUL STEAM HAMMERS



This Three Prong Rear King Bolt

MAKES STRONGER CONSTRUCTION POSSIBLE, BECAUSE THE AXLE DOES NOT REQUIRE BORING. THE KING BOLT PASSES BEHIND AXLE THROUGH A YOKE, AND IS DOUBLE LOCKED IN HEAD-BLOCK AND YOKE. THIS COMBINATION POSITIVELY PREVENTS RATTLING

WILCOX GEARS ARE MONEY SAVERS FROM A CONSTRUCTION STANDPOINT. EXPERT MECHANICS ARE NO LONGER REQUIRED IN YOUR ASSEMBLING ROOM. A BOY CAN PUT A WILCOX GEAR TOGETHER AS READILY AS A MAN, BECAUSE IT IS DRILLED IN EVERY PART BEFORE BEING SHIPPED. WE MAKE GEAR SETS IN SINGLE AND DOUBLE PERCH, FULL DESCRIPTIONS OF WHICH ARE CONTAINED IN OUR ILLUSTRATED No. 11D CATALOGUE. WRITE FOR A COPY TODAY

The D. Wilcox Mfg. Co.

Mechanicsburg, Pa.

The Hub

Entered in the New York Post Office as Second-class Matter

Vol. LV MAY, 1913 No. 2

THE TRADE NEWS PUBLISHING CO. OF N. Y.
Publishers of THE HUB

J. H. WRIGHT, *President.* G. A. TANNER, *Secretary and Treasurer.*
24-26 MURRAY STREET, NEW YORK.

Other Publications of Trade News Publishing Co.:
HARNESS (monthly).....per year, $1.00
AMERICAN HARNESS AND SADDLERY DIRECTORY (annual).....per copy, $4.00

THE HUB is published monthly in the interest of employers and workmen connected with the manufacture of Carriages, Wagons, Sleighs, Automobiles and the Accessory trades, and also in the interest of Dealers.

Subscription price for the United States, Mexico, Cuba, Porto Rico, Guam, the Philippines, and the Hawaiian Islands, $2.00, Canada, $2.50, *payable strictly in advance.* Single copies, 25 cents. Remittances at risk of subscriber, unless by registered letter, or by draft, check, express or post-office order, payable to the order of TRADE NEWS PUBLISHING CO.

For advertising rates, apply to the Publishers. Advertisements must be acceptable in every respect. Copy for new advertisements must be received by the 25th of the preceding month, and requests to alter or discontinue advertisements must be received before the 12th day of the preceding month to insure attention in the following number. All communications must be accompanied by the full name and address of writer.

FOREIGN REPRESENTATIVES:

FRANCE.—L. Dupont, publisher of *Le Guide due Carrossier,* 78 Rue Boissiere, Paris. Subscription price, 15 francs, postpaid.

GERMANY.—Gustave Miesen, Bohn a Rh. Subscription price, 12 marks, postpaid.

ENGLAND.—Thomas Mattison, "Floriana," Hillside Avenue, Bitterne Park, Southampton. Subscription price, 12 shillings, postpaid.

Entered in the New York Post Office as Second-class Matter.

The Automobile, the Buggy and Flies

The motor car is such an undoubted comfort and aid for traveling man, and it has proved its value so conspicuously that the special pleading of its ill-advised friends is becoming most tiresome. It ought to be allowed to go along and work out its patent destiny without making it climb to still steeper heights over the body of the uncomplaining horse.

If one listens to its too, too fulsome praise, it is plain that the only reason it doesn't run a cream separator and thus displace thousands of farmer's wives is because it doesn't like the taste of cream.

We now have the statistics lovers showing how a fifth of the planted land is needed to raise crops simply for horse feed—a monstrous waste which if abated would give millions grass, hay, corn and oats to eat in place of feeding it to horses, and so reduce the cost of living.

We can't see how this line of argument is one that strengthens a position, that in another paragraph is said to need no support; it's too militant, is the automobile to need anything except more people to buy it.

Another line of talk leads to the conclusion there is no other vehicle worth mention, and such as there may be, won't be for long.

The overwhelming growth of the industry is, or ought to be, argument enough. With all this growth, the simple little fact is still a fact that more common garden variety of buggy is made and sold in one year than there are automobiles made and sold in more than two years. Why blink these interesting developments? Why not let the horse pull those buggies? It isn't good for the farmer to pull them, nor are they adapted to hitch on behind an automobile, yet there are countless numbers using them, and in place of fading from our automobile-blinded sight, as they ought to do, they are being turned out this year in greater quantity than last year, while the automobile is not keeping up its speed. Fact is, it has gone from high to low gear in the matter of production, and it is not strange it should be so when the pace it set is considered.

The buggy, on the other hand, did have a set back, but it has come back, and is filling a need that no other vehicle is adapted to fill or it would not be put forth in such vast number.

The bigness of the country and the uniform bad average quality of the roads adapts it to conditions that would stall any well-intentioned automobile, and although horses demand a fifth of the tilled soil for food, his ration is not an ascending item among the index figures of commodities, while the power for an autocar is constantly going up in price, and there is no likelihood that it will be different so long as gasoline is used to create the power. The enthusiast overlooks all these drawbacks, or ignores them as without value, and goes to flies as his strong argument. The droppings from the horse, according to him, are a prolific source of fly breeding, flies carry contagion, breed panics, cause pestilence, and incite to war, and the horse is the prime cause.

Really it is becoming very tiresome to listen to the superheated partisans of the car. They defeat their object. They hurt the just cause of the automobile.

The buggy will stop awhile with us, it will depend on horses and harness for its usefulness, and it will work out its destiny in its appointed way without in any wise fighting the progress of the motor car. There is a place for both, a big place for each, but misguided boosters write as if we must all ride in autos or walk, when the fact is that only a very small per cent. of the people who do ride, can afford to ride in motors, or make it suit convenience or business to do so.

The fly, the horse and the buggy must be borne with yet awhile, and the automobile will prosper as usual, but

the extinction of its misguided partisan would not be disadvantageous to anyone.

"Old Machinery"

It is often wondered what becomes of used cars. We are great for chasing after new models, and to enjoy them causes the disuse of great numbers of very efficient vehicles that have nothing to their discredit except the late owner's fancy for something different.

We judge by lists of cars of other makers that we see bulletined in show windows for sale at bargain prices that there is a good amount of "taking in trade" to close a sale. It's not a very good way to sell a new vehicle, but it will make cars move when straight sales fail to do so.

These second-hand cars are sometimes very fine value, and will please the not too fastidious buyer.

Then there are "agencies" of all kinds that make a business of moving such vehicles. The great drawback in the mind of the buyer is the probable state of the engine of the vehicle. There are "guaranteed" sales that supposedly deliver the cars in prime order, and there are others who sell sight unseen, so far as a knowledge of the state of the machinery goes.

But all these channels do not seem to be worth, added together, the foreign dumping of these second-hand cars that go to almost all parts of the map, but cannot be well traced because the government lists them in its statistics as "old machinery," and as this list is inclusive from boilers to wrecking machines, it is hard to find the automobiles in the pile.

This outlet that at present is sporadic, seems to be attracting attention to the end that it may be systematized, promoted, and made profitable in itself, and besides, offer a means of keeping a valve on the supply and demand for new cars in the country of production, hence bring about stability of price.

Where second-hand cars find a foreign market there is no finical notions about "the very latest thing." The purchaser wants something that will move and keep moving until it wears to pieces. He is looking for a useful vehicle at a price that meets his views of value.

The repair parts for such a trade is one of the drawbacks unless makers keep on hand a sufficient supply for any model that has been turned out. A broken part difficult or impossible to replace is a bad feature when sales are being promoted. There is a profit in these "spares" and if the business should become an organized department of the industry it would pay to have full supplies of parts on demand.

These seconds are chugging around Russia, India, South America, and in other far away places, and are a very good advertisement for the American made car where they stand up and deliver service.

The automobile industry is no longer the snap it was before the novelty wore off. It needs effort and salesmanship to sell cars these times; and it is due somewhat to the fact that of the thousands of automobiles being turned out the point of saturation is making itself felt. The sponge of demand will take up only so much. The cars are being made better all the time. Barring accidental destruction they should wear well and long. Replacements could only come about by having the old cars moved out of the country. We look to see the "old machinery" items in the export tables attract more than passing interest.

Attitude of Teamsters

The International Brotherhood of Teamsters and Chauffeurs of America is a labor organization, and at a recent meeting of the Electric Vehicle Association in New York City, the general president and the general organizer had something to say on the subject of the evening, The Power Wagon Driver.

It seems these official mouthpieces of the teamsters are very kindly disposed toward power propulsion of work vehicles, and these two officers stated that they were bringing to the front the trained man of sound judgment and good morals for positions as drivers. They were taking them from the ranks of the married men by preference, believing that more steadiness and sobriety of conduct would there be found.

The brewer wagon drivers have an organization of their own, and in it there has been some friction owing to the demand that two men be assigned to a power truck. The brewers are users of electric trucks mainly. The brewery truck driver is much addicted to his schnapps, and we suppose there is more safety with two men on the box demi-semi full than where one wabbles alone. The electric, however, is simple compared with the gasoline engine, and an order of intelligence not nearly so high could be used.

The main point made is that the labor organizations are showing no antipathy to progress.

Twenty-seven Pounds of Paint

We find the most interesting news in the secular journals about automobiles. The enterprising writer gets next some car booster, and the later merrily fills up the writer in the most finished style.

The other day one of these automobile men finished off his day's work by telling the newspaper man that an automobile carried twenty-seven pounds of paint around with it. This paint was put on in seventeen different coats, enough one would say, to keep the car warm and comfortable in any climate.

To Stop a Damaging Move

The Carriage Builders' National Association, appreciating the gravity of the schemes that look to turning over the national forests to the control of states, through the medium of bills for the purpose introduced in Congress, earnestly asks members and all others to memorialize their Representatives that such a plan would be harmful in every way, to the people at large, and especially to the business interests that vitally need the conservation of forest products.

Such grasping, despoiling plans are perpetually being

fostered and promoted by selfish personal interest, and at this very hour there is need for prompt and forceful action.

A little indifference now, and the next development will be a fight to wrest them from monopolies that have grabbed them. It is easier to stop it before the work has to be all undone because it was not stopped in time.

The Way Not to Do It

A firm in Saloniki (scene of the war) sent an order for buggies and harness to a maker in this country, and at same time opened a credit in an American bank, but the order has not been filled at last accounts, and a long time has elapsed.

It is very curious that so much delay occurs in foreign shipments when the same kind of a domestic order would go in a few days and long time notes be taken in payment probably.

There may be special circumstances that would account for this particular case, but it is just such dilatoriness that stands in the way of many good foreign accounts. It must be partly due to lack of habit of doing foreign trade.

PROSPEROUS SEASON FOR CARRIAGE MAKERS

P. P. Hunter was installed as president of the Cincinnati Carriage Makers' Club, at the regular meeting at the Business Men's Club, April 7. Following the usual dinner and routine business the new board of directors was installed. The board consists of P. P. Hunter, A. S. Brown, W. J. Brunsman and H. M. Pollock. P. P. Hunter was unanimously elected president for the ensuing year; H. M. Pollock, first vice-president; W. T. Dennis, second vice-president; C. B. Vandervort, treasurer, and A. S. Brown, secretary.

Mr. Hunter is the president of the American Carriage Company and the Jewell Carriage Company. His election as chief executive of the Carriage Colub will mean the injection of more vim and vigor into the association. He was president of the club 18 years ago. Mr. Hunter is also associated with the Carriage Builders' National Association, and it is thought that through his influence the next convention of the national body will be held in Cincinnati.

The Carriage Makers' Club of Cincinnati is the largest organization of its kind in the United States, having a membership of over 200. It was organized in 1886.

Mr. Hunter said in his address, when he formally accepted the office to which he was elected, that Cincinnati was the thermometer of the carriage industry, and the rise or decline of the carriage market in the entire country could be measured by the growth or shrinkage of the weekly payrolls in that city.

TRADE PRESS CONVENTION

Eighth Annual Meeting of the Federation of Trade Press Associations Called for New York in September

President H. M. Swetland, of the Federation of Trade Press Associations in the United States, has announced that the eighth annual convention will be held at the Hotel Astor, New York, September 18 to 20, 1913. The Federation includes the New York Trade Press Association, the New England Trade Press Association, the Chicago Trade Press Association, the St. Louis-Southwestern Trade Press Association, the Philadelphia Trade Press Association and a number of unaffiliated publications, the total membership being 236, representing over 75 different trades, industries and professions.

President Swetland has appointed as chairman of the committee on arrangements, William H. Ukers, editor of the Tea and Coffee Trade Journal, who, as president of the Grocery and Allied Trade Press of America, was largely responsible for the highly successful grocery trade press convention held at the Hotel McAlpin, New York, last January. Mr. Ukers is arranging a programme for the Federation convention which will provide papers and addresses on topics of interest to manufacturers, sales managers and advertising men, as well as to trade paper editors and publishers.

Two sessions will be held daily. There will be editorial, circulation, advertising and publishing symposiums, under competent leaders. Many of the leading editors, business managers, buyers and sellers of advertising, and authorities on modern merchandising methods will take part.

On Friday afternoon, September 19, there will be a mass meeting with addresses by representative business and professional men, on subjects of timely interest to editors, publishers and advertisers. Distinguished guests and worth while speakers will be at the annual banquet, which will be made a memorable social occasion.

Invitations are being extended to manufacturers, sales managers, advertising men, trade paper publishers and all others interested in the idea of business promotion through trade press efficiency, which is to be featured at the convention.

GARAGE ASSOCIATION

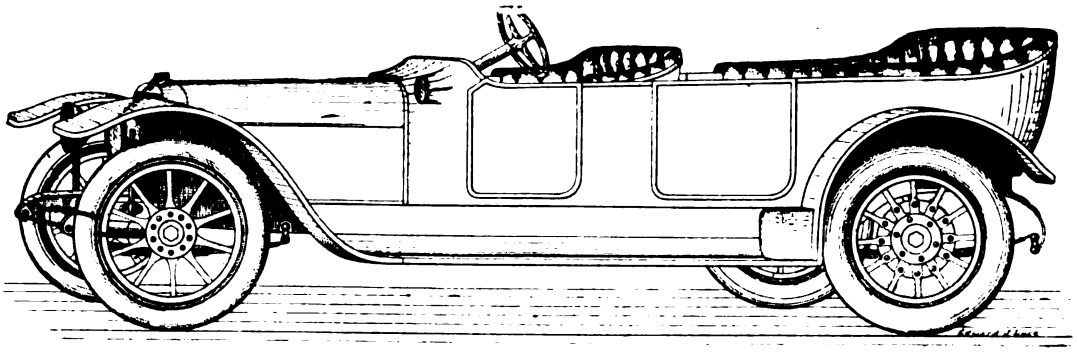
A meeting of representative Boston and Massachusetts garage owenrs was held on Thursday afternoon, May 1, at Hotel Lenox, Boston. About 30 were present. The meeting was called to order by Chester I. Campbell, who briefly stated the reasons for summoning the garage men, the principal one being to discuss and take action looking to the formation of a Massachusetts garage association. J. S. Hathaway, of the White Company, Boston, was elected temporary chairman. Remarks were made by John F. Fleming, of the Brookline garage; F. W. Boynton, of the Hyde Park Auto Station; J. E. Savell, of the Motor Car Service Company; J. B. Sullivan, Jr., counsel for the Boston Automobile Dealers' Association, and others to the effect that an association of this sort was badly needed in Massachusetts as it would tend to place the garage owners on a much higher plane than they have heretofore occupied. It would also add greatly towards impressing upon the automobile owner that by dealing with a member of the association he would be sure to feel that he was not overcharged for service rendered or supplies furnished. The following officers and board of directors was elected: President, J. S. Hathaway, of the White Company, Boston; vice-president, J. E. Savell, of the Motor Car Service Company, Boston; secretary and treasurer, Chester I. Campbell, 5 Park square, Boston. Board of directors, V. A. Charles, Inter-State Automobile Co., Boston; F. W. Boynton, of the Hyde Park Auto Station, Hyde Park, Mass.; John F. Fleming, Brookline Garage, Brookline, Mass.; J. S. Hathaway, the White Company, Boston; C. E. Harris, Harris Garage Company, Easthampton, Mass.; J. W. Robertson, Robertson Motor Car Co., Taunton, Mass.; R. H. Hartley, Church Street Corporation, Lowell, Mass.; J. E. Savell, the Motor Car Service Company, Boston.

The name of the new association is the Massachusetts Garage Association, Inc. Any garage owner in the state who is vouched for by a member of the association is eligible to membership.

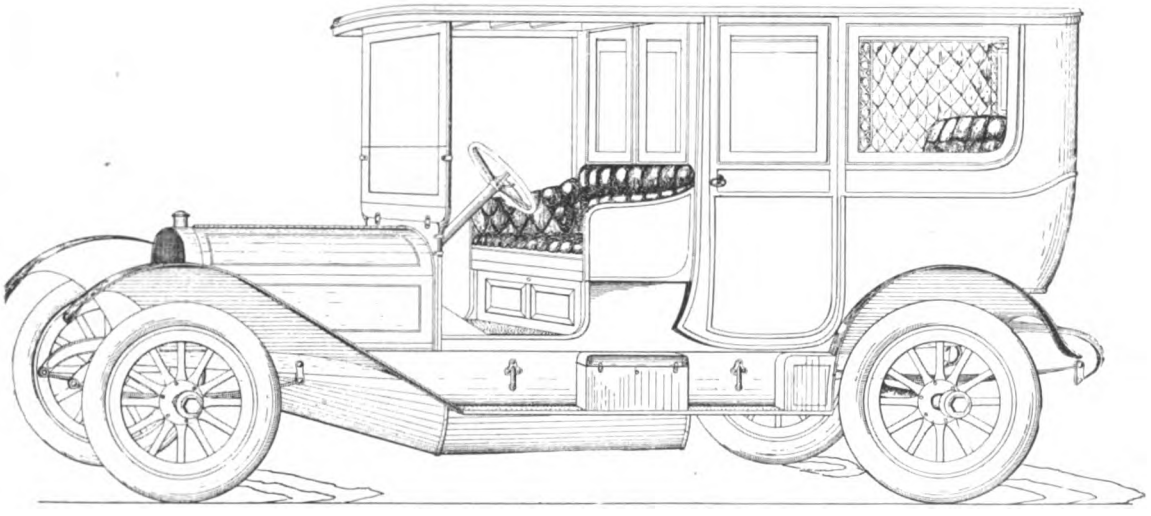
PRESIDENT WILMOT

F. C. Wilmot, of Stokan & Wilmot, South Varra, Victoria, Australia, has been elected president of The Master Coachbuilders' and Wheelwrights' Association of Victoria.

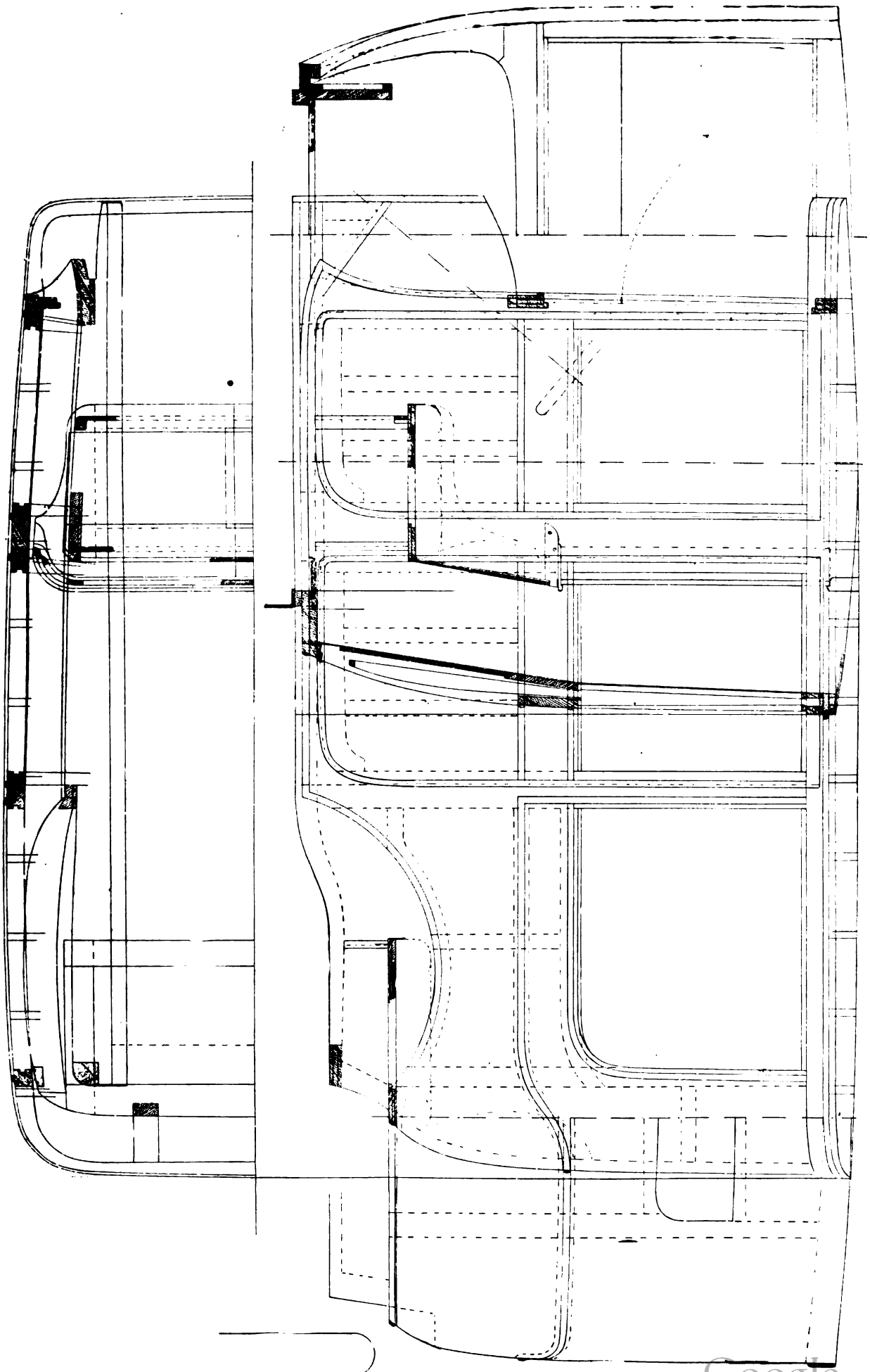
EXAMPLES OF GRADUATE WORK FROM THE TECHNICAL SCHOOL FOR CARRIAGE DRAFTSMEN AND MECHANICS, INCLUDING DESIGNS AND WORKING DRAFTS



TOURING CAR
By EDWARD J. LUCE
725 E. River St., Elyria, O.

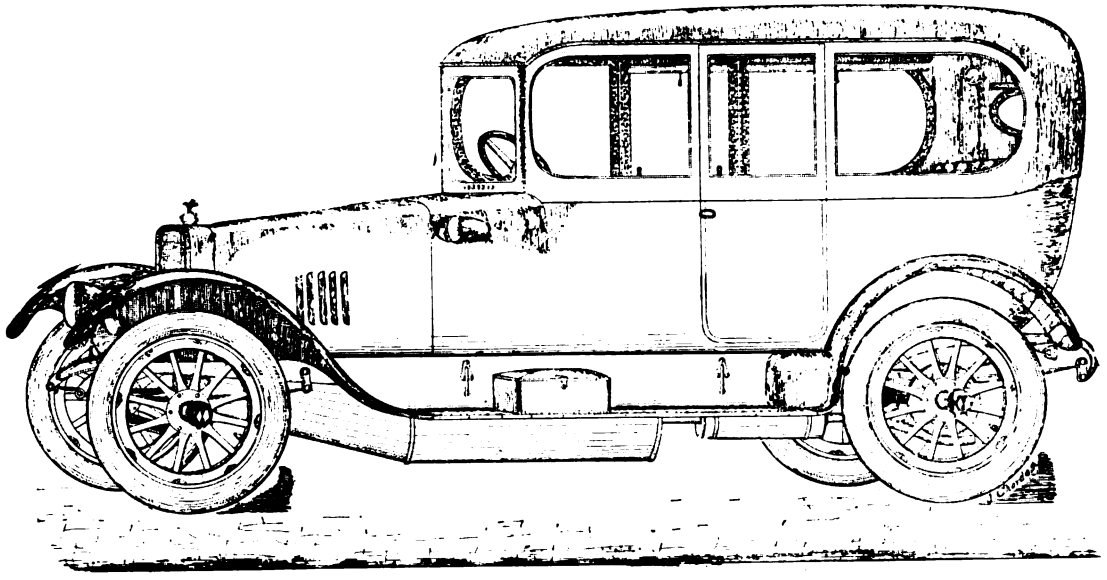


ROUND CORNERED LIMOUSINE
By JULIUS CHORDAS
233 East 84th St., New York

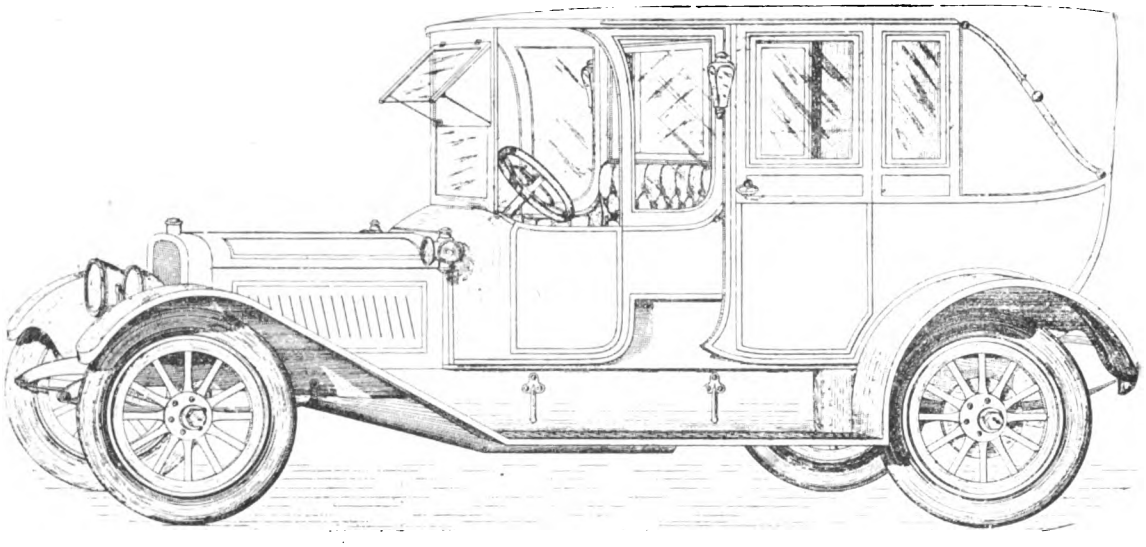


WORKING DRAFT OF INSIDE DRIVE VESTIBULE LIMOUSINE

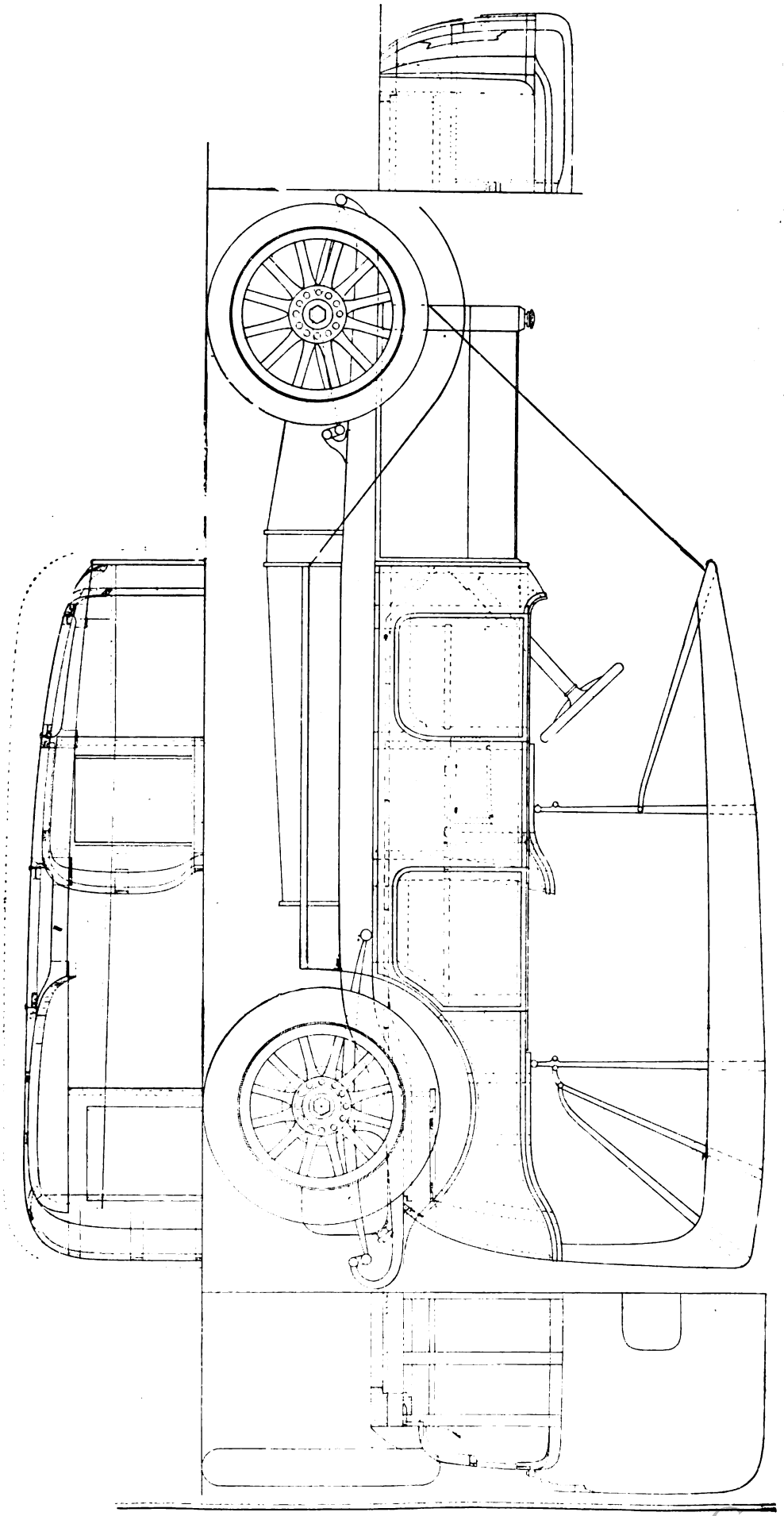
By JULIUS CHORDAS, 233 E. 84th St., New York



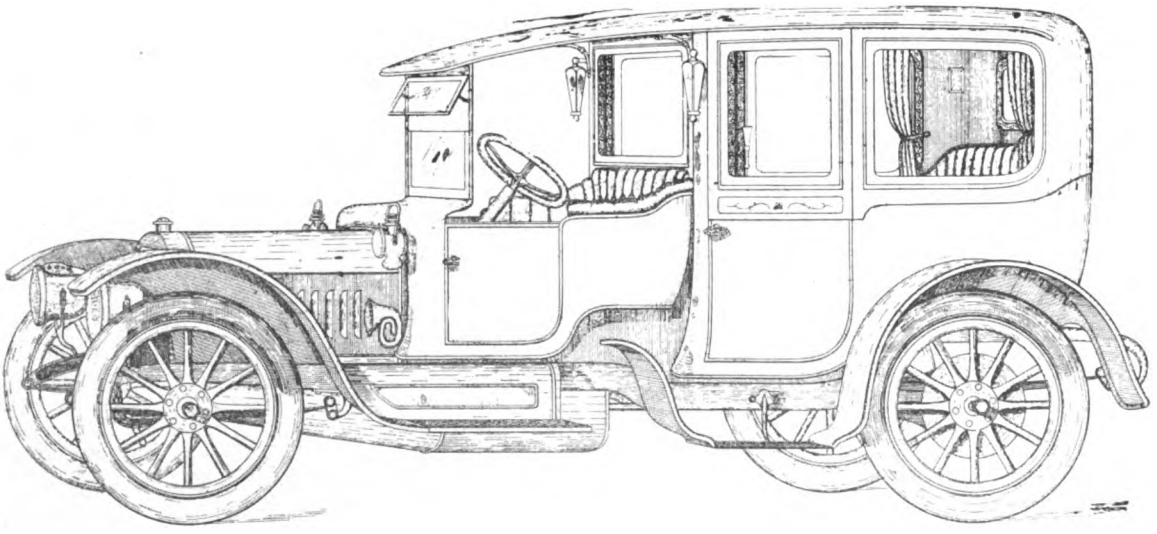
INSIDE DRIVE LIMOUSINE
By JULIUS CHORDAS
233 East 84th St., New York



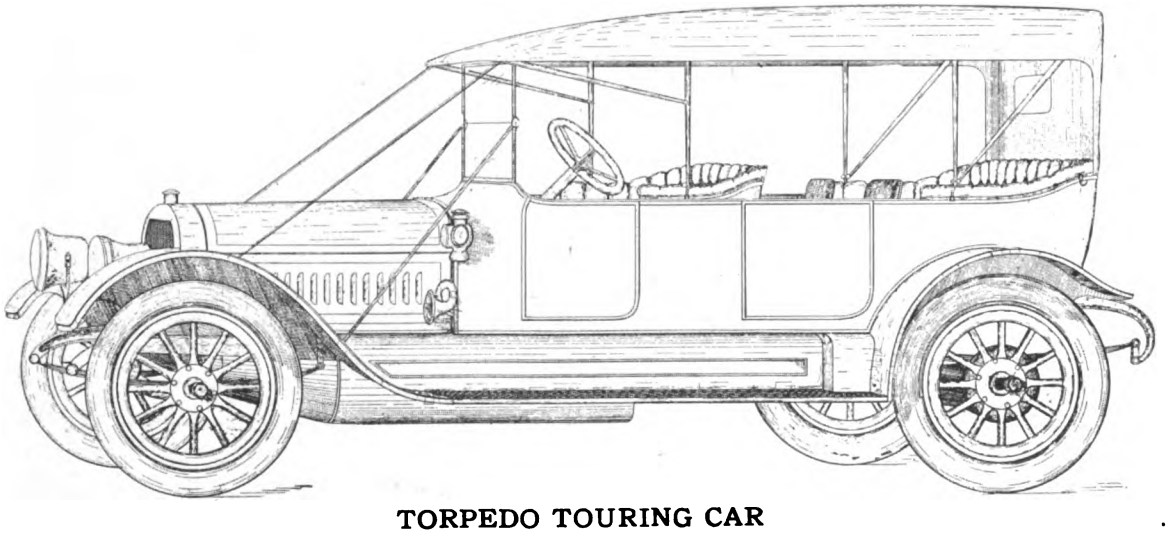
LIMOUSINE-LANDAULETTE
By ARTHUR P. FLETCHER
665 Hudson Ave., Detroit, Mich.



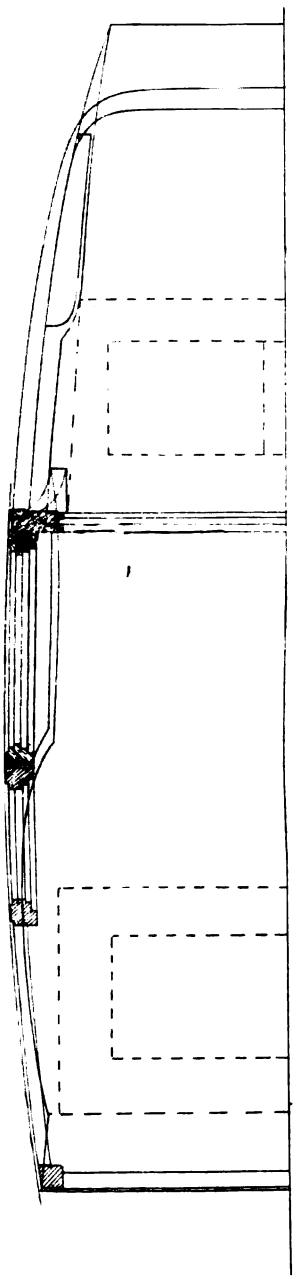
WORKING DRAFT OF LIMOUSINE-LANDAULET
ARTHUR P. FLETCHER, 665 Hudson Ave., Detroit, Mich.

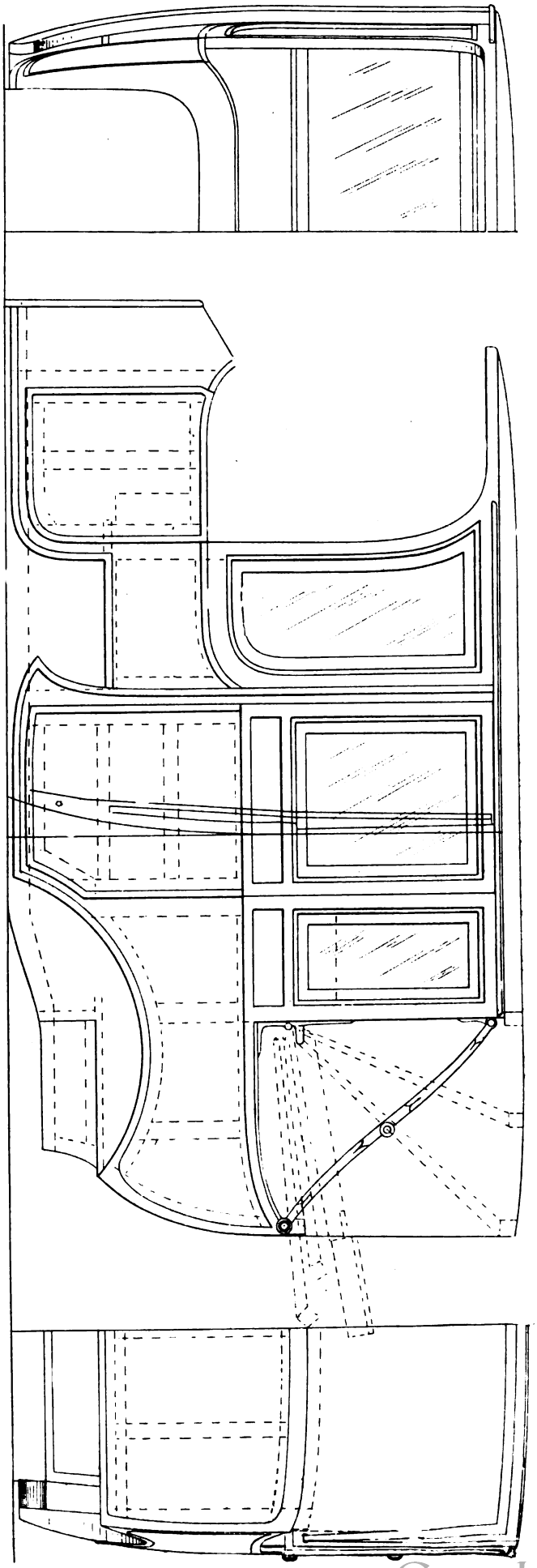


LIMOUSINE
By GEORGE BARRON
124 Horton Ave., Detroit, Mich.



TORPEDO TOURING CAR
By GEORGE BARRON
124 Horton Ave., Detroit, Mich.





WORKING DRAFT OF FOREDOOR LANDAULETTE

By GEORGE BARRON, 124 Horton Ave., Detroit, Mich.

THE MOTOR CAR MARKET ABROAD

Following is a brief taken from reports of consuls, etc., that have been sent to the government and appear in Daily Consular and Trade Reports. These reports were begun at the invitation of The Hub, and such as have already been published are very interesting. Some of the latest follow:

Features of English Motor Car Market

It is the opinion in Liverpool that conditions in the automobile trade were never more favorable, the trade continuing to flourish month by month. The population of Liverpool and suburbs is officially estimated at 1,073,585 and there are also throughout the neighboring country of Chester a large number of wealthy people residing in country places and on estates with whom an automobile is almost a necessity. A very large proportion of the people in Liverpool are laborers and small-salaried people who can not afford to buy motor cars. Probably the total number of owners and possible owners of automobiles would not run over two or at most three per cent.

The motor vehicles registered in Liverpool are as follows: For private use, 3,030; for trade use, 210; for public conveyance, 290; electric cars, 1; steam cars, 4; heavy motor cars, 114; motor cycles, 2,095; total, 5,744. Two well known dealers agree that the cars most in demand are those of 15 to 20 horsepower and that 50 per cent. of the purchases are of low-powered machines, 40 per cent. of medium-powered, and 10 per cent. of high-powered cars. A four-seater body, cape cart hood, wind screen, all lamps, spare wheel, and complete kit of tools is offered at $1,217 to $1,460. The finish must be good. A similar car of 10 to 14 horsepower, with detachable wheels, hood, and usual outfit sells for $974 complete ,and the medium-priced car sells for $1,850 to $2,680. It is estimated that about 10 per cent. of the cars sold have closed bodies. That 50 per cent. have four seats, 25 per cent. more than four seats, and 25 per cent. are built for two persons.

The prejudice that formerly existed against American cars has disappeared. The mail is now being largely carried to and from the central post office in American machines. It is estimated that of the makes on the market here 40 per cent. are English, 30 per cent. French, and 15 per cent. American.

The only car made in Liverpool is the Forrest car, and while the output can not be accurately ascertained, it is supposed to be about 100 cars annually. The local supply of fuel is good and ranges from 32 to 36 cents per gallon, wholesale, in price, with an increase of 4 cents to make retail prices.

Motor Cars Registered in Bristol

Statistics compiled on March 13, 1913, show that the number of motor vehicles bearing the index mark A E, registered in the city and county of Bristol, is 3,195, of which 1,096 were classed as motor cars used privately and for trade purposes, 345 were public conveyances, 116 heavy motor cars, and 1,638 motor cycles. These statistics are fairly accurate, as when a car changes owners the late owner must immediately notify the town clerk of Bristol under a penalty for noncompliance of £10 ($48.67). Driving licenses are granted for one year from the date of issue. During the past 12 months the number of licenses issued exceeded 2,660.

Motor Trucks Used for Freight Service

The recent threat of a general railway strike in England and the unrest among railway employes appears to have increased the demand for commercial motor vehicles. During the railway strike and the London dock strike in 1911 manufacturers of these vehicles secured large orders from manufacturers and others who suffered because of the tie-ups. Those who were then converted to the use of motor trucks have found the results highly satisfactory. For instance, in many classes of goods in England there is said to be a distinct saving in packing charges, as many products can be shipped by motor truck without crates or cases because they are delivered direct to the warehouse of the purchaser. A large supply of motors and mechanically propelled transport wagons will be among the many requirements for the mobilization of the home-defense army. The census taken recently has proved the shortage in the horse supply. Mechanical transport has been largely used in recent years by the Lancanshire Territorials at the annual training in consequence of this shortage in horses, and it is now largely used in the regular army. Where the roads have been in good condition the use of mechanical transport in carrying from one point to another the heavy baggage of an army and in keeping the commissariat well supplied has been more efficient and expeditious. But military transport is not confined to the roads, and the horse-drawn general service wagon has still its uses for cross-country traveling.

Market for Motor Cars in Bordeaux

The population of Bordeaux is 262,000; of the Department of the Gironde, 829,000; and of this consular district, 3,200,000. Possibly one-tenth of the population possesses the means to indulge in motoring in the sense of continued proprietorship of a car. This would provide for, say, about 60,000 cars. There is a fair number of pleasure motor vehicles in the cities, but touring, despite the excellence of French roads, has not come into such general favor as in the United States. The country in this district is flat to rolling, with the Pyrenees and their foothills in the south, and the mountain roads are usually good.

The machines most generally in use are those of 12 to 16 horsepower. The ratio of gears varies according to the desire of the purchaser, the preferred ratio being apparently 1 to 4. Four cylinders, in sets of two, are the most popular. The carburetor is of such advanced type that a run of 62 miles is required from 12 liters (3.17 gallons) of gasoline. High class equipment and finish are demanded and received, and by this is meant not garish ornamentation, but absolute wearing quality.

The retail prices of cars most largely used average about $2,000. There seems to be only a small market for either the high or low priced cars. People who can go in at all for motoring get a medium-priced serviceable car, and always with the intention of running that car a number of seasons—four or five at least.

No particular conditions exist which would seem to exclude any kind, grade, or price of machine from this market, provided that it is thoroughly reliable, that the cost of upkeep is low, and that provision is made for getting quickly spare parts and supplies during at least four years from the season of sale. The fact that a car is inexpensive will not alone commend it to the public. The maintenance expense must be proved to be low. This seems to be the only thing in the way of a serious market for American cars abroad. Americans may sell a few cars, but if those cars fail or their maintenance is costly, no others of the same make will find a market here.

Two makes of automobiles are made in Bordeaux, the Motobloc and the Georges Roy. The yearly output can not be ascertained. The cars are seen everywhere in this city, however, and both companies seem to be doing a favorable local business, having recently extended their works.

Electric automobiles are unknown, nor are conditions here suitable for their introduction or use. The local fuel is the usual motor gasoline, which sells in the city of Bordeaux (octroi duties included) at 54 cents per 5-liter tin or 41 cents per gallon; outside the city or octroi limits it is sold at 36 cents per gallon.

There are about 50 automobile dealers and motor car representatives in Bordeaux, and in the larger towns of this district there are usually from two to six. Nearly all have repair shops.

Sales are generally made through general agencies, though the Peugeot Co. has direct representation, with large show rooms, garage, and repair shops in the center of the city. There seems to be little choice between the two methods, though possibly a large establishment for the sale, exploitation, and repairs of American cars might be very successful if a combination of American manufacturers should open such an establishment.

The extent of territory usually covered is known as the "Sud-Ouest," comprising in general the southwestern part of France,

with Bordeaux as headquarters, and subagencies at Toulouse, Pau, Biarritz, and Agen. The commission is usually 20 to 30 per cent., terms of sale one-third with order with remainder on delivery of car and discount (to dealers only), 5 per cent. Cars are usually sold without body, but the dealer generally contracts to supply the body, tires and appurtenances.

By rail, cars are usually shipped unpacked, covered with tarpulins. Steamship companies carry them the same way, but the trans-Atlantic lines have varying requirements as to packing. A regular tri-weekly service is maintained between Bordeaux and New York, and Bordeaux and New Orleans, by the Compagnie Generale Transatlantique.

The sale of automobiles is as brisk as might be expected in this district. Dealers frequently, though not as a rule, carry a car in stock. In the case of French cars this is usually not necessary, as the garage will very likely contain a number of the cars, old and new, of the type which the dealer is endeavoring to sell. Neither extensive advertising nor the use of numerous salesmen is practiced, the manager or proprietor generally doing the sales work himself. The market appears to be well worked, and it is very doubtful whether other methods of sale, such as are common in the American market, would meet with popular approval.

There is no prejudice against American automobiles as such, because French people of this district neither know nor care about the American product. Prospective purchasers will not buy a car from a catalogue alone and the only practical way is to get the American cars running about the streets and roads, so they may be seen in action and tested.

Under existing conditions few would purchase an American car, because spare or replace parts could not be obtained at short notice, nor could repairs be efficiently and quickly made unless the mechanism were standardized to the French school. Promises to provide spare parts and to effect repairs at short notice would be ineffectual; the only guaranty people would accept would be that of a stock and repair shop on the ground and ready for legitimate business. [A comparative table of prices of American and French cars of approximately the same power and a list of automobile dealers and garages in Bordeaux was included in the foregoing report and will be loaned by the Bureau of Foreign and Domestic Commerce.]

Motor Car Owners in Johannesburg

A list of the 810 owners of motor cars in the city of Johannesburg, South Africa, and also of the dealers in automobiles and the garages there, has been received from Consul Edwin N. Gunsaulus, and will be sent to inquirers by the Bureau of Foreign and Domestic Commerce.

AKRON RUBBER STRIKE

The rubber strike at Akron finally dwindled down to nothing and expired of exhaustion the last of March, says The India Rubber World. Two weeks later the "Probe" Committee, appointed by the senate of the Ohio legislature, to investigate the cause of the strike, brought in its report. The committee found that there were no conditions existing in the rubber plants of Akron that could of themselves have occasioned the labor demonstration that began in February, and for a short time assumed rather threatening proportions. They report that the strike was almost entirely the work of agitators connected with the I. W. W., who went to Akron for the purpose of making trouble. The conditions in the rubber factories are reported to have been in the main excellent. The operatives are abundantly supplied with light and ventilation, and surrounded by the best conditions that modern sanitation has been able to devise. Nor did they have any ground for complaint in regard to the rate of wages, which in some departments, particularly the tire making departments, are reported as exceptionally high. The wages of the men employed in these factories range from 17 cents an hour for unskilled labor to 60 cents an hour for skilled labor. The wages paid the women range from 10 cents an hour for beginners to 30 cents an hour for experienced operatives.

There are practically but two paragraphs in the report which savor of criticism of the employers. One refers to the incident which was seized upon as an excuse to start the strike, where a new wage scale was put into force in a certain department of one of the factories. The committee reports that a greater length of time should have been allowed to intervene, for purposes of discussion, between the date of the announcement and the date when the new scale was to go into effect. The other point of criticism refers to the "speeding up" system, which the committee deprecates.

THE DROP IN TIRE PRICES AND WHY

On the 31st of March The B. F. Goodrich Company announced the reduction of price to the consumer of five per cent. in its general line of automobile tires, to take place on the first of April. Practically all the other important tire manufacturing companies followed with a similar reduction, although in some cases it did not apply to the entire line; some specialties being excepted. It is hardly necessary to state that this reduction in the price of automobile tires was extremely welcome to the car owners, particularly in view of the ascending tendency noticeable of late in the price of gasoline.

But that this reduction should have been decided upon so soon after the six weeks' strike in Akron, and when, because of that strike, there would naturally be a much smaller stock of tires on hand than would be the case under normal conditions, came as a surprise to the trade.

Two reasons are assigned by those who inaugurated this reduction, both sound and substantial; first, the marked drop in the cost of crude rubber during the last few months; and, second, the constant improvement in the manufacturing facilities.

It requires only a glance at crude rubber prices during recent years to see how steadily they have gone down. The price of Upriver Para on April 1, 1910, was $2.70; in 1911, $1.39; 1912, $1.22, and 1913, 87 cents. In other words, the best crude rubber costs today less than one-third of its cost three years ago.

In addition to the two causes assigned for the reduction, there is a third not officially referred to, but probably quite as potent as either of the others; namely, the increasing competition among tire makers. It is estimated that for the present year the consumption of automobile tires will reach 5,000,000. To supply that demand will require an average daily output of about 17,000 tires. There are two companies which have a combined daily capacity equal to this number; and besides these two leading companies there are between 40 and 50 other tire manufacturers, some of them of no mean importance. So it is obvious that the present capacity has outstripped the present demand, and is likely to exceed it for some time to come. This inevitably means that tire prices cannot be kept very much above the figure at which the best equipped companies can afford to market them.—India Rubber World.

HEAT TREATMENT OF METAL

"The heat treatment of steel is practically a new science—a new advance in the metallurgy of steel. It is an adavnce that comes directly from the rapid growth of the motor car industry and its resultant demands for maximum efficiency in constructional materials. Doubtless the application of heat-treating methods would have been developed by the steel manufacturers in time, but the fact remains that its adoption was forced on them by automobile interests," says J. H. Nead, metallurgist for the H. H. Franklin Manufacturing Company, manufacturers of the Franklin automobile.

"Heat treatment, defined according to modern practice, consists of subjecting the material, steel in this case, to thermal manipulation, that is to alternate processes of heating and cooling conducted in such a manner as to affect the useful

physical properties of the material. Generally the physical properties are increased in value and heat treatment may increase all or a part of the properties independently of each other, or it may increase some at the expense of others.

"The processes of heat treatment may be subdivided into the following specialized operations: Annealing, hardening or tempering, drawing or drawing the temper, and case carbonizing.

"The one important thing in a heat treatment is that a high degree of judgment and intelligence, and an absolute knowledge of steels is required to satisfactorily apply heat treatment methods to the most advantage. This has not arrived at such excellence as now prevails without years of research work and much time and expense. It has resulted in the improvement of the strength and toughness of steels. It has made possible the use of the best materials available, developing the maximum physical properties of these materials, and has greatly increased the efficiency of the present steel parts in automobile construction."

EFFECT OF FOREST FIRES ON STANDING HARDWOOD TIMBER

The most noticeable effects of a fire are the killing of the young growth, the destruction of the layer of leaves and mulch on the ground which protects the soil from washing in times of heavy rains, and the fire scars left on the trees of all ages and sizes. It is the object of this story to call attention especially to the damage to merchantable timber evidenced by these fire scars. Though the study was made in the Ozark Mountains of Arkansas, the results are applicable to other hardwood regions.

All settlers and lumbermen who have worked in the hardwood timber in the Ozarks know only too well what is meant by pin worms, bunch worms, flag worms, grub worms, soak, and butt rots, and how great is the loss of timber due to them. Damage by insects and rot was found in connection with practically every fire scar on the bases of the trees. The fire may have occurred 50 or 100 years ago, and all signs of it been hidden by the later growth, but during the two or more years that it took the tree to heal over the scar, worms, and spores or germs which produce rot in trees, entered at this open wound on the butt, and, in the case of the rots, have been at work ever since, gradually destroying the timber in the trunk.

Any little pile of leaves and other trash, which winds and water may have left lodged against the base of a tree, will, when dry and set on fire, produce sufficient heat to cook and kill the living bark and sapwood for several square inches on the butt. The injury thus caused is apparently slight, but in reality the damage done may continue during the entire life of the tree, and may finally cause its death. It is mainly through such small fire scars that the worms and rots get into trees.

The spores, or "seeds," of the tiny fungus plants which cause the rot fall on the dead spot or fire scar, sprout during damp weather and grow into the heartwood of the tree. Once in the heartwood, the little plants use part or all of the wood as food, and thus gradually destroy the sound timber, producing what is called rot, dote, or soak in the trunk of the tree. The small fire scar may, and usually does, heal over, so that in a few years no evidence of a fire or injury to the tree can be seen from the outside; but the rot continues to grow for years, slowly spreading outward, until it reaches the sapwood, and upward in the trunk, thus ruining the tree for most commercial purposes. Every time a tree is reached by a fire hot enough to kill a small area of the bark and sapwood an opportunity is given for more worms to enter and for another attack by the little plants which produce rot. Where trees are growing on steep slopes small piles of trash collect on the upper sides at the base. In such cases even a light fire, which ordinarily would not be able to injure the tree at all, burns this pile of trash and a fire scar is formed. On the sides of Pilot Mountain are dense stands of young oak saplings from two to six inches in diameter, every one of which has a fire scar on the upper side of its base, due to the burning of these piles of trash. This means that a large number of these saplings will grow into trees having butt rots and wormholes in the trunks. Similar conditions can be seen on nearly every mountainside in the Ozarks.

Anyone in passing through a stave sale area after all the good bolts have been removed has noticed the large amount of cull left on the ground. Sometimes entire trees have not yielded a single bolt. What was the matter? Worms, rot, or soak had ruined the tree for staves. Cull butts from six to sixteen feet in length are not uncommon on many areas where the timber has been felled. In nearly every case these butts were left on account of rot. Practically all of this was caused by fires which injured the bases of the trees.

The loss of good merchantable timber in a stave operation from rot and worms alone is enormous. Yet it is often said that light fires do not injure the forest, and some even claim that it is a benefit to burn the forests annually. On one stave sale area in the Ozarks 76 trees out of every 100 felled had butt rot, and 27 trees in every 100 had wormholes of some kind in them. What does this mean? It means that after going to the expense of felling 100 trees only 24 of them were perfectly sound and suitable for staves. Not only was there a money loss from the cull of 76 trees, but the expense of felling unsound trees must be considered. For five widely separated areas in the eastern part of this forest an average of 65 trees in every 100 had butt rot, and 26 had wormholes sufficient to cull some of the bolts.

Most of this loss can be traced directly to the fires so common in this forest. The area where 76 trees in every 100 were found to have butt rot has been burned over regularly for years. Over areas where fires had not been so frequent, the injury from butt rots was correspondingly less.

Another way that fires injure standing timber is by burning through sound bark and sapwood into the hollow butts. Once the hollowed-out interior of the tree is exposed to the air, the rot which originally caused the hollow seems to grow up the tree more rapidly, while other fires that follow gradually widen the hollow and destroy the bark at the base of the tree until the tree is killed.

A tree which has an open, hollow butt is much more easily blown down than one in which the hollow is inclosed by living bark and sapwood.

We find, then, that forest fires damage standing timber in three ways: By producing fire scars through which worms enter, by opening a passage through the bark and sapwood for rots to reach the heartwood, and by weakening trees with hollow butts till they either burn down, die from fire girdling, or are blown over by strong winds. Every fire, therefore, only increases the damage by making possible a new crop of worms in the trees and by giving another chance for rots to enter through the new fire scars, thus increasing the quantity of unmerchantable material and decreasing the amount of money received for the timber.

This deterioration in the standing timber is the direct source of a tremendous loss to the entire community, for no one will buy worthless timber. The timber itself is not only a total loss to the settlers and other owners, but by its presence it also increases the cost of lumbering and decreases the stumpage value of what timber is merchantable. Furthermore, it means a loss in wages to the laborer, and a loss to the state of the 35 per cent. of all receipts from the sale of government timber appropriated by Congress for the construction of public roads and for the maintenance of schools within the state.

The conclusion, then, is obvious, that the continued burning of timbered lands in Arkansas is causing an annual loss of thousands of dollars—an absolute detriment to the welfare of the state. And it is equally obvious that this loss can be almost entirely eliminated by the prevention of all forest fires, whether large or small—a comparatively easy matter if all the people will only co-operate in the work.

T-SQUARES AND DRAWING BOARDS

For a good many years the writer experimented with straightedges for T-squares, drawing-boards and triangles. He found T-square blades and heads generally crooked when purchased. Triangles as a rule are not 90 degrees, as can easily be found by drawing a line with one and then turning it over and drawing another line close to the first; furthermore, the edges are not straight, especially near the ends, but are almost invariably convex (not concave), so that they rock even on a true straightedge.

No wood that I have tried as yet is free from warping. Hard rubber is no better than wood, and has the added disadvantage that it attracts and holds dust electrically and then distributes it upon the paper. It also oxidizes superficially and rubs off upon the paper. Celluloid is really a considerable improvement on wood, in that it does not warp and twist of its own accord as wood does, but it is too soft, and will not remain in adjustment long.

I had an aluminum T-square head made, and it has worked splendidly. It is so light that it does not overbalance a short blade when on the edge of the board, and I believe I am right in saying that aluminum would not soil the paper, though I have not tried it as a blade.

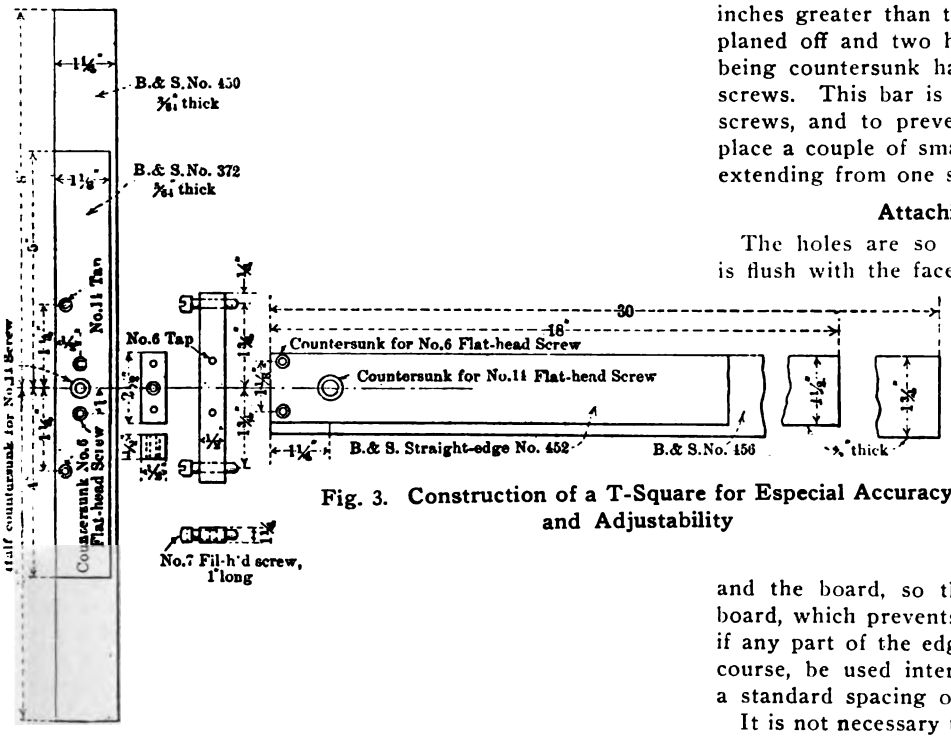


Fig. 3. Construction of a T-Square for Especial Accuracy and Adjustability

Steel, on the other hand, is inclined to cover the paper surface with a coating of black dirt, and it lacks the transparent edge of the celluloid; but it is the only thing that is satisfactory for fine work.

Steel straightedges for clamping on the edges of drawing-boards have been made before, but as usually made they are expensive and not very practical. To rabbet out the edge and set in a straightedge is expensive, and spoils the table surface.

The problem was solved by the writer for a table with a 42-inch edge by screwing five maple brackets to the side of the table in the manner shown in Fig. 1. Two screw-holes were tapped in a cold-rolled steel bar 1½ x ⅛ x 42 inches, and two corresponding holes through two of the brackets, and the steel bar secured by passing stovebolts up through the brackets (with washers under the heads) and into the screw-holes in the bar. All five of the brackets were secured to the underside of the table by two screws, except one of the two which carried a stovebolt, which was secured to the table by only one screw, thus leaving it free to swing enough to take up differences in expansion and contraction. If the brackets support the bar unevenly, their level can be adjusted by means of paper shims.

The cold-rolled bar is not quite straight enough for work with an ordinary T-square, and should be planed off. I find that it can be made straighter by a face-cut of a milling tool than on a planer, although the tool leaves marks on the planed edge. If an extra long T-square head be adopted, say 15-inch, planing may be unnecessary.

For a small hand-board a different and simpler arrangement is to be adopted. The straightedge for the hand-board is sim-

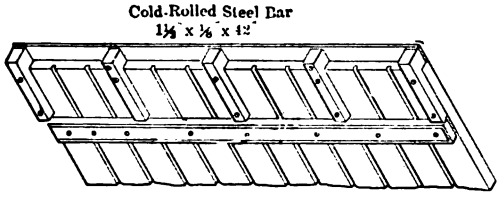


Fig. 1. Applying Maple Brackets for Securing Straightedge to Drawing Boards

ply a cold-rolled bar ⅝ inch square, and having a length several inches greater than the side of the board. One face of this is planed off and two holes bored through this face, these holes being countersunk half way to admit the heads of roundhead screws. This bar is attached to the side of the board by two screws, and to prevent splitting it will be found desirable to place a couple of smaller screws on opposite sides of the hole, extending from one side to the other of the board.

Attaching and Adjusting the Bars

The holes are so placed that the upper surface of the bar is flush with the face of the board, and its lower end projects several inches beyond it (see Fig. 2). This projecting end will not cause serious inconvenience, and it will be found a great help toward drawing horizontal and vertical lines in the correct position near the bottom of the board.

The screw holes are made larger than the screw shanks, so as to admit a little play before tightening them, and a couple of paper washers are placed on the screw-shanks between the bar and the board, so that the bar stands a little off from the board, which prevents it from being bent, as would be the case if any part of the edge of the board projects. The bar can, of course, be used interchangeably on different boards by using a standard spacing of screw holes.

It is not necessary to have the bar perfectly straight, nor even visibly straight, as compared with a steel scale, but it should be

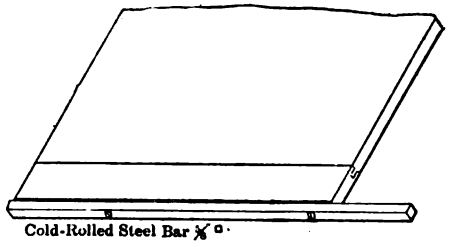


Fig. 2. The Straightedge When Applied to Drawing Board and Projecting Beyond It

remembered that the shorter the T-square head the straighter the bar must be, and by using a long steel head even a considerable inaccuracy (provided it is not a convexity) of the bar may be neutralized.

The T-square head is of almost equal importance with the fixed straightedge. Steel T-squares are for sale in the market,

and those wishing to save trouble can buy them. The writer prefers to make his own, which is easily done at an expense no greater, when results are compared, for the purpose of both accuracy and adjustability. Steel straightedges of different length, which should be thin to give them some flexibility, are used for the blades. A shorter set having a length of 9 to 15 inches, and thick, are used for the heads.

A block 2½ x ½ x ½ inch is secured by screws to the middle of the head, and forms a means of attachment for a pivot screw by which the blade is secured to the head (See Fig. 3).

The screw is so placed that the end of the blade projects about ¾ inch beyond the back edge of the head. A second block 4 x ½ x ¼ inch is secured by two screws to this projecting end at right angles to the blade.

The screws are threaded into this block in such a manner that their ends abut upon the back edge of the head, and the T-square is ready, with interchangeable heads and interchangeable blades, adjustable to any angle within 10 degrees of the horizontal.

Many persons object to steel blades on account of the dirt they spread over the paper, as aforesaid. The larger part of it, however, is derived from matter which adheres to the steel and not from the metal itself, either directly or by rusting. Practically I have not been seriously inconvenienced; it is only necessary to keep the paper clean, the T-square bright by the occasional use of crocus, and to use a hard pencil. The dirt which is due to the square is no worse certainly than that which accumulates on the paper without it, and can be removed by a cleaning rubber.—George W. Colles, in Engineering News.

STANDARDIZING THE DRAUGHTING ROOM

The firm of Seehase & Pansegrau in Berlin is now offering stencils and shapes by means of which draughtsmen can mark bolts and nuts of standardized dimensions without constructive effort, and similar contrivances are under preparation for other parts which have become standardized in various industries. The method used consists mainly in providing perforations of a transparent sheet at the determining points in the contours to be drawn. The pencil point is inserted in these holes and the marks so made are connected; though not necessarily before the inking. Some of the holes indicate centers of curves; others fix the relation to median lines of the construction. The supposition is, of course, that drawings are made only to a few standardized scales. For the factory's own use it is clear that the drawings of standardized parts may be entirely omitted, and the stencils may then be used only as a means for checking up the dimensions of the construction.

C. H. A. T. WILL MEET WITH TRI-STATE

The executive committee of the Carriage, Harness and Accessory Traveling Men's Association, at a recent meeting, decided to hold their next convention at Louisville, Ky., the week of November 10-15, the same time as the convention of the Tri-State Vehicle and Implement Dealers' Association.

The following are the officers of the C.H.A.T.: President, W. J. Sohlinger, Dayton, O.; secretary-treasurer, Jesse L. Nelson, 40 Sargent avenue, Somerville, Mass. Board of directors—C. C. Hayes, chairman, New York City; E. A. McGrew, Philadelphia, Pa.; W. W. Wood, Philadelphia, Pa.; F. D. Reed, Boston, Mass.; Grant Wright, Philadelphia, Pa.; P. D. Randall, Springfield, Mass.; F. H. Gowen, Little Falls, N. Y.; H. E. Copeland, West Newton, Mass.; E. B. Williams, New York City; Geo. W. Huston, Cincinnati, O.; John F. Galvin, New York City.

PROSPECTS FOR HORSE VEHICLES

Reports from manufacturers, dealers and traveling salesmen are to the effect that the horse vehicle business is on an upward trend. Accessory people who supply the horse vehicle manufacturers with tehir materials say that the majority of their customers are favoring them with orders of steadily increasing size.

In the west and central sections more buggies and light carriages are being sold to the consumer than for several years past. This feeling has had the effect of encouraging dealers to order more freely for the spring trade which is already well under way. The indications are for a renewed interest in horse vehicles during 1913, which will include not only carriages but wagons as well.—Implement and Vehicle Journal.

DEATH OF W. W. HURST

Walter W. Hurst, one of the best known vehicle salesmen in the middle west, dropped dead on March 12, just as he was entering the hotel dining room at Fond du Lac, Wis. The cause was heart failure. Mr. Hurst had been with the Troy Wagon Works Co., Troy, Ohio, about 18 months, and was working on a county deal at the time of his death. He was 42 years old, and was living at Columbus, Ohio. He is survived by his widow and four children.

The funeral was held at his old home in Greencastle, Ind., where his mother still resides.

Mr. Hurst was in the retail business for several years as a member of the Hurst Buggy Co., of Greencastle, Danville and Roachdale, Ind. He then associated himself with J. W. Rippy, of Oklahoma City. He returned to Indianapolis and joined the Rex Buggy Co., of Connersville, Ind., as traveler for the northern Ohio territory, leaving them to go with the Troy Wagon Works Co. As a buggy and wagon salesman he had few equals. His volume of business for both the Rex Buggy Co. and the Troy Wagon Works Co. was remarkable, and justified his reputation as one of the highest salaried travelers in the vehicle field.

SIMPLE METHOD OF COMPARING FLAMES

One candlepower, according to the accepted standard, is the light given off by a spermaceti candle which burns at the rate of two grains of spermaceti to the minute, and this is the basis upon which the illuminating ability of any illuminant is judged. From this standard it is quite simple to establish an arbitrary unit, styled the candle-foot, representing the degree of illumination of an object placed one foot from the candle. Hence, of any other illuminant, such as an acetylene flame or an electric lamp, the distance, expressed in feet, at which the same degree of illumination of an object is obtained, as is obtained at one foot with the standard candle, represents the candlepower of the radiant.

It is impossible, of course, to judge of the candlepower of a flame by looking at it, for even if the iris of the eye did close sufficiently to obviate dazzle, which it does not do, comparison of two flames, one of known candlepower and the other of unknown candlepower, could not accurately be made. Proper comparison requires a piece of apparatus that is very easily made. It consists of nothing more complicated than a pasteboard tube 10 inches long painted dead black inside and having both ends capped. In one end a square hole, with the sides measuring exactly one-eighth inch is cut, and in the other end a pinhole (assumed to be exactly one-fiftieth of an inch in diameter) is made.

How Brightness Affects Illumination

If any flame is viewed through such a tube, the eye being presented to the pinhole, the flame in the square aperture at the other end will appear of a certain brightness. Moving the source of light nearer to or further from the aperture will not appreciably diminish the brightness if the vision is directed always toward the same part of the flame. Similarly, the actual illumination at the eye-piece of the tube will remain the same, and this illumination can be taken to indicate the "intrinsic brightness" of the flame.

FRENCH KEROSENE MOTOR STARTS COLD AND RUNS ON ANY KIND OF CRUDE OIL WITHOUT CARBURETOR

A four-cycle motor capable of starting up cold on kerosene, of running on any kind of crude oil, weighing no more than a car motor, having a normal compression, having no carburetor and using no compressed air, has been produced by M. Bellem, a French engineer. It is claimed, licenses to construct have been secured by Delaunay-Belleville and by Messrs. Sautter & Harle, a French firm employed largely on army and navy work.

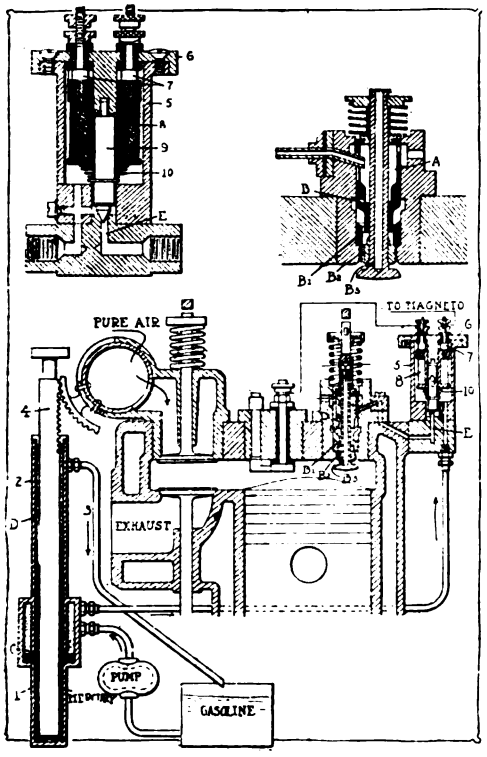


Fig. 1. General drawing of motor, showing the detail of the distributor with its magnetic coils, the pulverizer and the pressure-controlling device with its column of mercury. The fuel is carried from the tank to the pressure regulator by means of a pump placed in the position shown in the illustration.

The similarity between the standard type of motor car running on gasoline and the Bellem, consuming kerosene or crude oils, is found in the fact that the former can readily be converted to the latter. Most of the experimental work has been done on motors so converted.

On the Bellem there are the conventional mechanically-operated intake and exhaust valves, but the intake, instead of admitting gas, allows pure air to pass through and does not open until 30 degrees before lower dead center. It closes about 30 degrees after lower dead center. The exhaust valve has the usual timing.

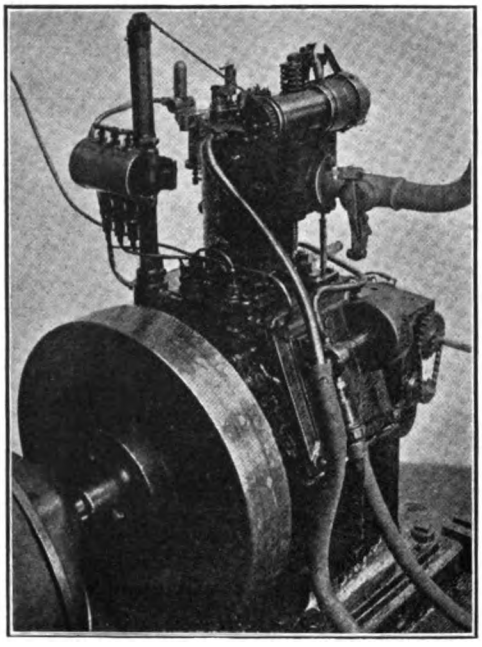


Fig. 3. Single-cylinder motor using the Bellem method of fuel pulverization. The spring of the auxiliary intake valve may be noted, projecting above the top of the cylinder, while the fuel pump is operated by silent chain from the extremity of the crank shaft opposite the flywheel.

In the head of the cylinder is fitted a combined automatic intake valve and pulverizer. With the main valves closed there is a considerable depression in the cylinder during the

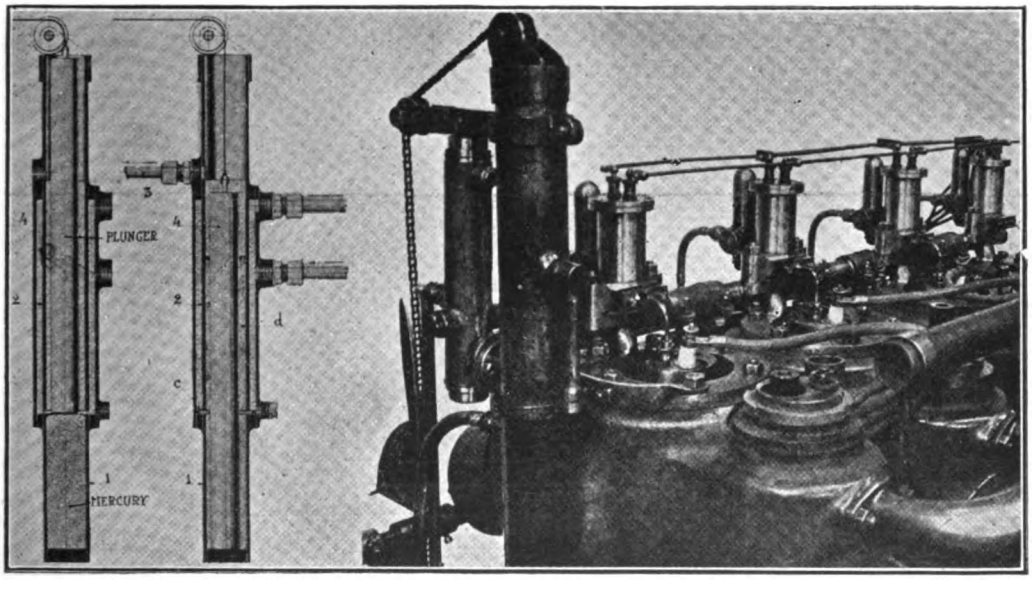


Fig. 2. Left, details of fuel-pressure device in Bellem motor. Right, top appearance of motor when fitted with the fuel pulverizing apparatus employed by Bellem

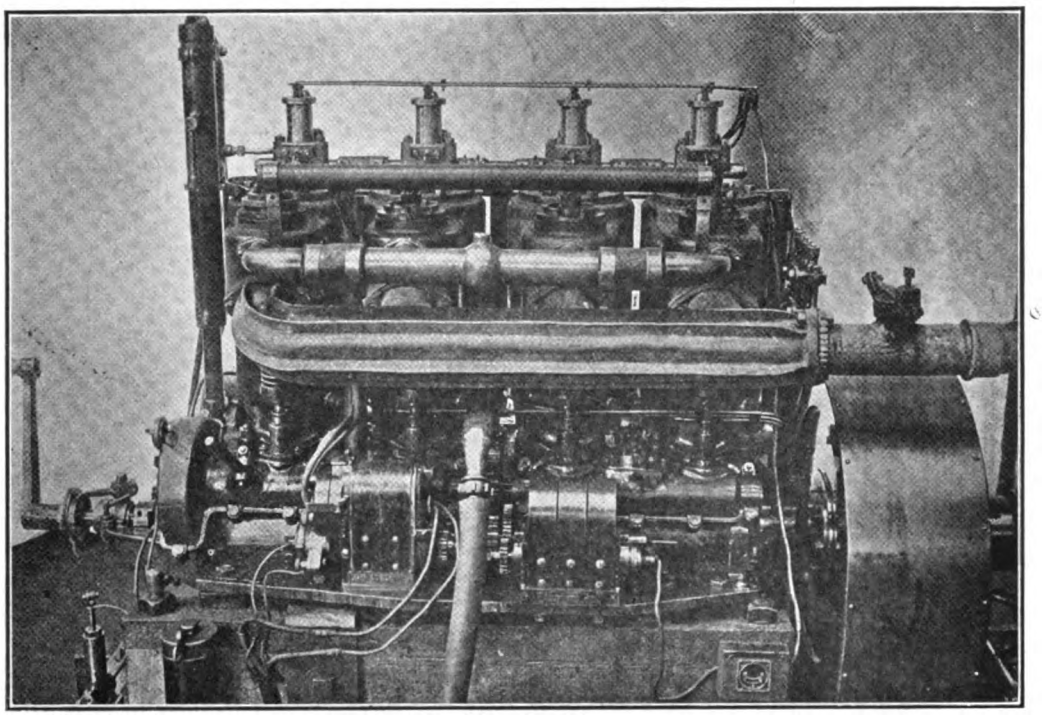


Fig. 4. Exterior appearance of Bellem motor adapted for automobile use. The magnetic control is governed by the wires running through the tubes along the top of the cylindrical distribution

first portion of the intake stroke. The suction of the piston opens the automatic valve illustrated in detail in Fig. 1. A charge of fuel having been brought up to this valve under pressure, the liquid and at the same time a certain quantity of air are brought in from A to B, through the holes B1 and then through B2. Finally, pure air is drawn through the hollow stem of the valve and the holes B3, completely pulverizing the fuel. Strong claims are made for this type of pulverizer working in a partial vacuum. In a recent test, a stonecold, single-cylinder demonstration model was cranked by hand with the ignition cut off. At each exhaust stroke a puff of vapor came through the port, and on a mirror being held before it not a trace of condensation was to be seen. The inventor claims that he obtains cold vapors. A demonstration of this is to place a metal tube near the exhaust, heat it by a soldering lamp and drop kerosene onto the hot tube. At the same time the cold motor is cranked by hand, when the vapors coming out of the exhaust port are indistinguishable from those obtained by burning kerosene on the hot tube. The demonstration motor, after standing all night, had cold water from the city mains run into its jacket and was started on the first pull of the handle against compression. This was repeated several times after the cylinder walls had been allowed to cool by a constant circulation of water from the mains.

After running for five minutes on kerosene, this fuel was shut off and crude oil allowed to flow. No difference could be detected in the running of the motor and the exahust was perfectly clear. Speed variations were obtained from 200 revolutions per minute running light to 1,200 revolutions per minute under load. Varying the speed as quickly as possible by use of the throttle and ignition cut-off, it was impossible to get anything more than a slight puff at the exhaust; this puff lasted but a fraction of a second and had nothing that indicated incorrect mixture.

The secret of the invention lies in the complete pulverization of the fuel in a partial vacuum. Experiments have shown that if the same pulverizer is used in a chamber at atmospheric pressure and with compressed air passing through the valve, the results are not the same, there being a certain amount of condensation. It is claimed that the late opening of the main air valve does not prevent a complete filling of the cylinder.

The fuel, as already explained, is delivered under pressure to the vaporizer. This necessitates the use of two distinct organs, a pressure regulator and a distributer. The pressure regulator is shown separately in Fig. 2. It is fed from a kerosene tank by means of any suitable type of pump, and consists of a metal vessel, 1, containing mercury, and welded to it, a metal tube the lower end of which is level with the top of the mercury. In the tube is a plunger, 4, capable of being raised and lowered in any convenient manner, and, according to its

SOME RESULTS OF TEST MADE ON BELLEM MOTOR IN LABORATORY OF THE AUTOMOBILE CLUB OF FRANCE

Module	Size of Blades in Mm.	Number of Hole	Temperature in Degrees Centigrade	Atmospheric Pressure in Mm. Mercury	Revolutions per Minute	H.P	Corrections in Hundredths	Effective H.P	Consumption Gallons per Hour	Specific Consumption Gallons per H.P. Hour	Observations
4	240x240	6 5	13	756	820	5 2	−2	5 1			Fuel kerosene
4	240x240	6 5	14	756	813	5 1	−2	5 0	1 42	0 .42	Test lasted 2 hours
4	240x240	6 5	14	756	811 5	5	−2	4 9			
4	240x240	6 5	15	756	811 7	5	−2	4 9			
4	240x240	7	10 5	771 5	773	5.1	−1	5 15	1 2	0 214	Fuel Alcohol: Test. 1 hour
4	240x240	6 5	12	764 5	760	4 3	−1	4 25	0 396	0 920	Fuel crude oil Test. 1 hour

Motor, single-cylinder model of 100 by 150 millimeter bore and stroke. The motor was started cold with the use of kerosene only. The first test lasted two hours, the second test one hour, and the third also one hour. Acceleration from 183 revolutions to maximum speed under load was particularly easy.

position, varying the height of the column of mercury, D, in the tube 2. The height of the column of mercury determines the pressure of kerosene in the chamber, C. The excess of fuel passes through the mercury column and down the overflow pipe, 3, to the tank. The feed pump has a capacity slightly greater than that of the motor under full power. The amount of fuel flowing through the return pipe with the motor under power is insignificant and there is no danger of the mercury being carried through with the fuel. The plunger is connected to the air valve, thus a single operation, controlled either by governor or by hand, determines the pressure of fuel to the distributer and the amount of air admitted to the motor.

It will be noted that the feed pipe connects the pressure chamber with the distributer placed to the right of the automatic valve. This distributer is shown separately in Fig. 4. The pressure being variable at will the distributer is not called upon to regulate the quantity of fuel in any way. Its opening has to be constant and independent of the motor speed. It will be readily understood that an opening which allowed the correct amount of fuel to pass at 1,000 revolutions would be too great at 500 revolutions if a mechanical control was employed. With a mechanically operated valve, also, there would be a possibility of the motor stopping with the valve open when the fuel would continue to flow until pressure had fallen off. The control is therefore magnetic, the apparatus comprising a soft iron core, 5, with a cover, 6, to which is attached the coil, 8, by means of the insulated terminals, 7. In the center of the coil is a needle valve, 9, maintained on its seat by the coil spring, 10. At the moment of breaking contact on a low-tension magneto, the needle valve is raised from its seat and the fuel under pressure in the feed pipe passes through E to the pulverizer. The opening of the valve is practically instantaneous and its length of opening depends on the weight of the needle valve and the strength of the spring. The length of opening is obviously constant, whatever the speed of the motor.

In Fig. 1 the motor is shown with low-tension ignition. All the experimental models, however, have been fitted with an ordinary type of high-tension magneto for the ignition and a low-tension magneto for supplying the current to the magnetic distributer. The compressions of the charge, firing and exhaust are carried out as on a normal type of four-cycle motor. When motors have been converted the compression has not been varied and has generally been between 60 and 70 pounds per square inch.

A test of one of these motors carried out at the laboratory of the Automobile Club of France is given herewith. The motor was a single-cylinder vertical of 100 by 150 millimeters, 3.9 by 5.9 inches, bore and stroke. The compression was 71 pounds per square inch.

The motor is adapted to marine, stationary or automobile use. The crude fuel gave the greatest economy over a test running for an hour. It may be noticed that a higher rotative speed was used with the kerosene than with the other fuels and that the kerosene tests extended over a longer period.

BRANDEIS ON "SCIENTIFIC MANAGEMENT"

Some persons have assumed that the aim of scientific management was "speeding up"—that it seeks to make the men work harder, thus exhausting the workingman. That shows a complete misconception. Conserving human effort and the man is a fundamental tenet of scientific management. The larger production is not attained through "speeding up." It comes largely from removing the obstacles which annoy and exhaust the workman—obstacles for which he is not and should not be made responsible.

The management sees to it that he is shown the best way of doing his job. The management sees to it that his machine is always in perfect order. The management sees to it that he is always supplied with the necessary materials. The management sees to it that the work comes to him at the proper time, with proper instructions, in proper condition.

Again, some persons have expressed their apprehension lest scientific management be found hostile to unionism. This rests upon an entire misconception. The essence of unionism is collective bargaining. Is there not just as broad a sphere for collective bargaining in shops where scientific management has been introduced as where it has not been? Surely it is not inconsistent with the principles of collective bargaining that one person may earn more than another; for in most successful unions, like the cigar makers' and the boot and shoe workers', most of the operators are on piecework, and the earnings of some workers are double or treble the earnings of others doing like work in the same shop.

Scientific management undertakes to secure greater production for the same or less effort. This does not mean that less people will have work to do.

Has any one ever heard the demand for labor to decrease when profits were large? The demand for labor grows because the demands of the people grow with the ability to meet them. It has been suggested that scientific management will displace the inefficient. On the contrary, it will help the inefficient most. It supplies instruction, and offers to the teachers special incentives if they succeed in bringing up the hindermost.

The social gains to the workingman through scientific management are ever greater than the financial. He secures development and rises in self-respect and satisfaction with his work. Eagerness and interest take the place of indifference, because the workman is called upon to do the highest work of which he is capable, and because in doing better work he secures appropriate recognition and reward.

AMERICAN AND FOREIGN MOTOR CAR EXPORTS

The Manchester Guardian, published in Manchester, England, gives the following table showing the value of the motor cars and parts exported from France, the United Kingdom, and the United States since the beginning of the industry. The record starts with the year 1897 in the case of France, and 1902 in the case of the other two countries.

Year.	Year ended Dec. 31. United Kingrom.	France.	United States (year ended June 30).
1897	.....	$121,000	.....
1898	.....	340,000	.....
1899	.....	832,000	.....
1900	.....	1,834,000	.....
1901	.....	3,070,000	.....
1902	$837,000	5,883,000	$950,000
1903	1,674,000	9,898,000	1,207,000
1904	1,747,000	13,825,000	1,895,000
1905	2,637,000	19,568,000	2,481,000
1906	4,228,000	26,833,000	3,497,000
1907	6,725,000	28,098,000	5,501,000
1908	6,423,000	24,779,000	5,278,000
1909	8,141,000	28,541,000	5,992,000
1910	13,460,000	31,510,000	11,190,000
1911	17,246,000	30,795,000	15,509,000
1912	.....	.....	25,657,000

The preponderance of French exports over British rose to its maximum in 1906 and since then has declined fairly steadily. It is only since 1904 that the exports of motor cars, motor cycles, and parts from the United Kingdom have been separately distinguished. In the years since then the imports and exports of motor cars have been as follows:

Year.	Net imports. No.	British exports. No.
1904	4,964	701
1905	5,046	1,078
1906	5,103	1,379
1907	4,285	2,318
1908	3,396	2,216
1909	3,116	2,580
1910	3,694	3,555
1911	5,731	4,536
1912	6,276	5,282

England still imports a larger number of complete motor cars than it exports, though the excess of imports was only about 1,000 in 1912 instead of over 4,000 in 1904, but the value of complete cars exported is greater than the imports. The number of cars imported from the Netherlands decreased from 93 in 1907 to 18 in 1912; Switzerland, from 89 to 6; Italy, 28 to 2; and France, 3,613 to 2,236, showing how great has been the decline of French cars sold on the British market. On the other hand, the number of cars imported from Germany has risen from 174 to 275; Belgium, 219 to 439; and from the United States, 555 to 3,734. France and the United States are still the most important sources of British supply.

British Exports—American Competition in Australia

In 1911 out of a total British export of $13,295,000 of motor cars, chassis, cycles, and parts $6,526,000 went to foreign countries, and $10,769,000 to British possessions. Out of a total of 4,536 complete cars 1,027 went to foreign countries, the best markets being Argentina and Brazil, and 3,509 to British possessions, the best Empire markets being Australia and British India. Of motor cycles, 1,026 went to foreign countries and 6,324 to British possessions, the best markets being New Zealand, Australia, and the Transvaal. Considering the value of motor vehicles and parts of all kinds in 1911 the best British markets are found to have been as follows: Australia, $3,451,068; British India, $1,923,318; France, $1,572,905; New Zealand, $1,536,095; Argentina, $873,356; Cape of Good Hope, $770,488; Transvaal, $401,880; Germany, $378,910; United States, $377,386.

The British commissioner in Australia reports that American competition with the British product is keen in that country and says further:

"The American manufacturer of both motor cars and buggies which reach the consumer here at a cost of under £300 ($1,460) has met with a considerable amount of success. This competition is not confined to the cheapest class of cars, however, as it is understood that the United States manufacturers are cutting into the trade for cars up to £500 and £600 ($2,400 and $2,900). Buyers state that the American car is lighter, has a greater clearance from the ground than that of United Kingdom origin, is cheaper to operate both with respect to the gasoline used and the wear and tear of the tires, and the capital outlay, car for car of the same power, is said to be far less for cars of American manufacture."

The imports of motor cycles, mostly British, into New Zealand increased from $63,000 in 1910 to $194,000 in 1911. The number of motor cars rose from 772, valued at $1,075,000, to 1,524, valued at $1,970,000. The total British export to New Zealand in 1911 represented about 61 per cent. of the total importation. The only serious competitors are the United States and Canada.

NOISELESSNESS

The silent running of a car depends upon the machinery as a whole, upon the distribution of forces and masses in the vehicle, upon the oscillations and vibrations of machine and vehicle parts, upon the balancing of motor forces and finally, in relatively small degree, upon the valve movements. Details of a motor, such as the magneto drive, the pump drive, etc., may cause more noise than the motor proper. Silence can be secured with poppet valve, if they are raised gradually with short lift and are closed gradually, which is only a matter of correct design. The main cause of noisy running at high motor speed lies in the vibrations of machine parts. Every part has its own radius and period of vibrations and a critical vibration at which the noise becomes maximum. When the critical vibrations of several parts coincide the noise can become intolerable. The principal means for securing noiseless running is therefore: To avoid or to break up and muffle the vibrations of individual parts. Subsidiary means for the same purpose consist in: The use of slide valves (sleeve or rotary) instead of poppet valves, the encasing of valve action, etc. The main causes of the noise are entirely independent of the system of valve control. It is one of the results of the introduction of sleeve valves that now noiseless running is demanded of all automobiles, and this demand can be met with any correctly designed and built poppet-valve motor. But there are many experienced drivers who do not wish complete silence, so far as the motor is concerned, and on the contrary much prefer that the motor shall have something to tell them of its inner workings during the running.

SCHACHT IN RECEIVER'S HANDS

The Schacht Motor Car Co., of Cincinnati, maker of the car and truck of that name, was placed in the hands of Receiver John F. Dietz on April 17. He is a desk manufacturer and also a director and a stockholder in the Schacht Company. His appointment was recommended by most of the stockholders and approximately 85 per cent. of the creditors.

Before the receivership proceedings had been instituted, several meetings of stockholders, directors and creditors had been held and an attempt made to have a creditors' committee take over the management of the business, but as many of the creditors and at least two of the stockholders were unfavorably disposed, these efforts to effect an amicable arrangement were defeated and a race to the insolvency court ensued.

The friendly stockholders and friendly creditors reached the court first and secured the appointment of Dietz as receiver, but their action hardly had been instituted when attorneys acting for John H. Muller appeared and also asked for the appointment of a receiver. Muller is the holder of a note for $8,551, payable February 2 last, and other notes, aggregating $11,000, due in February, 1914.

The book value of the Schacht company's assets are approximately $600,000 and its liabilities less than $175,000, so that it is believed that with proper co-operation creditors will receive 100 cents on the dollar and a comfortable margin be left for stockholders even in the extreme event of winding up the business, which extremity it is believed will be avoided through the present arrangement.

Internal troubles concerning its management caused the first rumbling in the Schacht organization but they were in a fair way of settlement when the disastrous floods occurred, the full effects of which were felt by the Schacht people.

SPURWHEELS OF MUSLIN

A great many sheets of muslin—the number depending on the width of gear teeth that is wanted—are piled in a stack and soaked in machine oil, whereafter round blanks are stamped out of them. Each of these is placed between steel disks of equal diameter and powerfully compressed to the required thickness, then riveted or bolted. The gear teeth are then milled in the usual manner. The durability of the muslin gears is said to be extraordinary and due to (1) the elasticity of the teeth (the confining steel plates taking no direct part in the work), (2) their indifference to mineral oil which is injurious to rawhide, (3) a certain self-oiling property derived from the oil used in their production, and (4) their indifference to such overheating as may be caused by overloading and neglected lubrication. On the last point, it is claimed, the superiority over rawhide is marked, with the result that the dimensions of a muslin gear—and therefore also those of its metallic mate—may be figured without the large allowance for possible overheating which is necessary with other silent gears. Similar gears made from textile material are made in Germany.

NAT'L ASSO. OF MANUFACTURERS MEETING

The 18th convention of National Association of Manufacturers will be held in Detroit, May 19-21.

A number of addresses on interesting topics are scheduled. The array of speakers is impressive so far as names can make such an effect.

THE ESSENTIALS OF CAR EFFICIENCY

It is comparatively easy to write of efficiency. The very word has a soothing sound. But what precisely is meant by the term when applied to the motor car as a whole? Thermal efficiency in the cylinder of a steam engine, or of an internal combustion motor, presents little technical difficulty to determine. The mechanical efficiency of the engine itself is simply solved by comparison of indicated horsepower with brake horsepower; the latter obtained by dynamometer test. But in motoring generally, when the term is used as a measure of the actual power available for propulsion at the road wheels, for overcoming road resistance, work against gravity and air resistance, the problem is seen to be more involved.

For the purpose of simplifying the question it may be dealt with under three heads, viz., efficiency of the engine, in the transmission, and in the design and construction of the car itself. Frequently one hears the matter discussed as though efficiency of the engine were the final necessity. Occasionally the transmission is subjected to searching inquiry to ascertain its relative efficiency. And then, too, body design is criticized in its relation to wind resistance. The three factors are interdependent and should be considered conjointly. For that car is the most efficient only which combines to the highest degree the possibilities of efficiency of all the factors. True, a relatively high efficiency of an engine, with a low efficiency transmission and body design, might actually result in a more efficient car than one with more efficient transmission and body and less efficient engine. But final, or car, efficiency is to be obtained only when the individual efficiencies are of the highest possible.

Dealing first with the engine it is seen that more than mere thermal efficiency—avoidance of unnecessary heat losses—is desirable. The engine has to be taken as part of the load to be carried. Design, then, must be considered in relation to weight. It is evident that an engine might be constructed which would give a high degree of thermal efficiency and yet be deficient in ultimate effciency because of its own mass. If, however, weight be sacrificed beyond the point of critical resistance to stresses arising from reciprocal movements, losses are occasioned in mechanical efficiency. In addition then to general excellence of design, to secure mechanical efficiency by balance of reciprocating parts, effective lubrication to reduce friction losses to a minimum must also be provided.

In designing the engine it has to be remembered that the mechanical output is determined by speed, pressure and time. Pressure is directly determined by piston area and compression space; piston speed, and therefore rotative effort, by stroke lengths and mean pressure; and the time element is expressed by revolutions of the flywheel per minute. These are merely the fundamentals. Because it is seen at once that pressure depends too, indirectly, upon speed of inflammation of charge, its tenuity, grossness, and its physical gaseous constituents and their specific calorific value. The moment of ignition—its relation to piston positions in the complete cycle—also influences the mean effective pressure very considerably. Flywheel design and weight, in relation to stroke and compression ratio, and the resulting maximum pressure, have to be finely discriminated to produce an efficient engine. Such a one is that in which the highest mechanical output is given not only at the lowest permissable weight, but with the smallest consumption of fuel and lubricant per brake horsepower given.

But these are only the preliminaries with regard to the engine design. Port areas, valve forms, inlet pipe sections, exhaust leads, and silencer capacities, all indirectly influence the mean pressure. Water cooling carries us a stage further. And then there is carburetion to be considered. Other things being equal, a hot engine is far more efficient than a cooler one. Reducing the temperature of the cylinder walls by water-cooling means losses in thermal efficiency. Not to cool them would result in greater losses by positive mechanical friction due to failure of lubrication. The thermal losses by cooling are also counterbalanced by the increased density of the charge. In a very hot engine the charge expands upon contact with the cylinder walls before compression, and the effective pressure after combustion is lowered by the tenuity of the charge. The very hot engine is "tired," the lubrication is less effective, there is destructive attrition of cylinder wall and piston rings, and the aggregate calorific value of the charge is reduced.

Carburetion now depends—as it did at the inception of the internal combustion motor—upon the suction of the descending piston. This action defeats itself by its very simplicity. And it is negative rather than positive action. When the motor lags by virtue of its overheating the charge becomes less dense, and its power falls off still more. True, throttle control partly balances this. It is possible to give a fuller charge at such times, but this does not overcome the immediate expansion on contact of the first portion of the charge and the reduction of suction—"back electro motive force," the electrician would call it—that results. It should be a simple matter to design a gear that would pump the charge positively into the cylinder and so render the carburetion and capacity charge independent of the suction effort. The question here is not that of the constituents of the gaseous mixture. That is another problem altogether. The point at issue is that of getting a full charge—cubic capacity at normal pressure—into the cylinder.

Mean effective pressure depends directly upon compression ratio, maximum pressure moment and stroke length. Compression ratio and stroke length we will ignore for the moment. Maximum pressure moment depends upon time of ignition and speed of inflammation or combustion of the charge. Time of ignition is variable, speed of inflammation depends primarily upon quality of mixture and heat and volume of spark, and its position. In engine with slow piston speeds the inflammation of the charge is relatively instantaneous, and therefore highly efficient. In engine with high piston speeds the relative speed of inflammation is much slower and therefore less efficient. The piston has descended appreciably before the maximum pressure has been exerted, and the mean effective pressure is lowered accordingly. High efficiency would be reached by a system of sparks which would ensure the practically instantaneous inflammation of the charge relatively to the highest piston speeds used. It is assumed that the carburetion independently will ensure the use of the most effective mixture.

In reviewing the efficiency of transmission systems there are seen to be three types—with a corollary to two of them at least—belts, chains and live axle, with gearbox generally in addition to the two latter. The causes of losses in efficiency are primarily slip in the case of the belts, and friction in the two latter and the gearbox. Against all of them must be set off the loss due to mass. Each, as an integral part of the motor, has to be moved against gravity, and the weight of the system as well as its inherent friction losses must be considered. For practical purposes of comparison, the belt may be omitted. It no longer counts in modern motor car practice. There remain chain drive and live axle: the latter either with pinion and crown wheel or worm drive. Broadly speaking, the issue narrows itself to line friction against surface friction: the roller against the tooth. Theoretically the chain should win. But in practice, on the test bench, it is hard to determine which is the better. The chain stretches and the chain wheels wear; the result is a great drop in efficiency. But then in the case of the pinion and crown wheel wear also results, with a corresponding drop in efficiency. Form of tooth, contrast or identity of materials, or if the wheel diameters differ greatly in size and therefore have more or less friction imposed upon them, complicates the problem.

Lubrication, either of chains or of gears, is a factor of importance in calculating the ultimate efficiency of a system. There would probably be more difficulty in ensuring in a chain system the effective lubrication which is easily possible in an enclosed gear system. This may well be the reason why the gear system of live axle has entirely superseded the chain drive. And it may equally well be that with an effective system

of enclosing the chains and ensuring perfect lubrication for them we shall see a return to the system which is theoretically the best. The gearbox itself, in spite of its perfect lubrication possibilities is, on account of its weight and unavoidable friction losses, the member that could best be spared to secure the highest possible efficiency if an engine of unlimited flexibility could be produced.

Recent practice, without actually eliminating the gearbox, has approached within measurable distance of it. Six and even eight-cylinder engines, with wide ignition range, throttle control and fairly good carburetion, united with a highly efficient clutch, have enabled a heavy car to be driven without changing gears at all, with varying speeds, over diversified country. Speeds of 40 to 60 miles an hour or more have been obtained on the level, and the car taken up stiff hills without changing gears. It may be reasonably urged that a very large reserve of power is essential in this case, but a high engine power does not necessarily imply inefficiency. In its true sense economical control without unnecessary losses does imply efficiency. And it is here that the powerful engine with a wide range of flexibility scores.

Turning now to body design, two factors present themselves for consideration. These are weight and head resistance. Here, too, as in former cases, weight must not be sacrificed at the expense of rigidity of structure. And comfort, too, for the traveler must be provided. Within these limits the body should be as light as possible. It may now be possible for ordinary chassis to take a perfect streamline body. Such a form would necessarily mean the sacrifice of some comfort for the occupants. But the closest approximation to it, without encroaching unduly upon accommodation, is that which makes for highest efficiency. The happy mean has, of course, to be sought. At comparatively low speeds the loss from head resistance is almost negligible. Today, however, the tendency is all in the direction of high speed with economical fuel consumption. The head resistance increases as the square of the velocity; the losses then, it will be seen, at high speed will be very considerable. The springing and shock absorption devices have a direct bearing upon efficiency. Theoretically the propulsion of the motor should carry it along a straight line in a horizontal plane. Generally, however, the car proceeds along a road that is far from horizontal. Its depressions convert the motion of the car into a rhythmic series of movements in two directions, vertically and horizontally. Anything which tends to lessen the undesired movement in the vertical plane economizes so much of the power as is otherwise absorbed. Efficient spring suspension and shock absorbers and dampers which will almost wholly neutralize such movements make also for efficiency.—J. W. F., in The Motor.

DUNLOP WIRE WHEEL RIGHTS ACQUIRED BY AMERICAN COMPANY

Adding interest to the wire wheel situation, there has been incorporated under the laws of New York, the Dunlop Wire Wheel Corporation of America, capitalized at $400,000, Walter L. Fry, of New York City, and two others, figuring as the corporators, but the "others" are merely dummies. Fry will become president of the corporation, and is understood to have uncommonly substantial backers, who, through the Dunlop interests in England, have acquired a license to operate under the Rudge-Whitworth patents.

Fry is no stranger to the auomobile industry, having manufactured a spark plug which bore his name, and also having been identified with the import trade. He is not quite ready to make known all his plans, which, however, are of a very comprehensive nature.

Abroad, both the Rudge-Whitworth and Dunlop people have been manufacturing wire wheels for several years. Originally they operated under separate patents which led to a long legal battle between them, and which ended in the Dunlop people being forced to recognize and take out a Rudge-Whitworth license; it is said to be of such scope as to enable the Dunlop interests to grant rights to the newly organized Dunlop Wire Wheel Corporation of America.

NEW MEN AND MORE MONEY FOR McCUE WIRE WHEELS

The McCue Co., of Buffalo, N. Y., consummated plans in the nature of a reorganization and a refinancing, $300,000 in cash being added to working capital and a number of men strong and prominent in Buffalo commercial life entering into its affairs. They are Ralph Plumb, vice-president and general manager of the Buffalo Bolt & Nut Co.; R. G. Wright, president of the R. G. Wright Co., of Buffalo, and of the Reed Mfg. Co., of Erie, Pa.; Samuel Ellis, an officer of the Manufacturers' and Traders' Bank, of Buffalo; and Edward McM. Mills, of the law firm of Rogers, Locke & Babcock. These gentlemen, with C. T. McCue, form the directorate.

Following the election of the new directors, they, in turn, chose officers, as follows: C. T. McCue, president; Ralph Plumb, vice-president; Samuel Ellis, treasurer; Edward McM. Mills, secretary. In addition, C. H. McCullough, Jr., although he does not figure as a director, has become one of the heaviest stockholders in the McCue organization. He is vice-president and general manager of the Lackawanna Steel Co. and a man of means and wide experience.

The reorganization, however, did not stop at the business office. It was carried into the McCue factory itself, W. T. Evans having been engaged to fill the offices of general manager and production manager. Previously, and since its inception, Evans had managed the Metal Products Co., of Detroit. E. E. Arnold, who also was a member of the Metal Products staff, and who had experience with the A. O. Smith Co., was added to the McCue traveling force.

Orders have been placed for machinery and equipment to increase the McCue capacity to 1,000 wire wheels per day by August 1.

EVELAND TO SELL HIS FOREIGN RIGHTS

Although the English automobile trade has been slow to embrace the electric lighting and starting system, not to say the electric gear shift, a syndicate of English bankers has seen the merit of those devices and for the purpose of completing the sale of those devices which he controls, S. S. Eveland, of the Eveland Engineering & Mfg. Co., of Philadelphia, Pa., sailed for London April 24.

The syndicate has an option on Eveland's electric starter, which is being manufactured by the United States Lighting & Heating Co., and on his electric gear shift, which is being made by the Vulcan Motor Devices Co., of Philadelphia, also an electric riveter which he has devised. The syndicate is seeking the rights not only for Great Britain but for France and Germany, which latter countries Eveland also will visit.

FOREIGN NOTES

Messrs. Cottenet and P. Kellner have been selected by the Chambre Syndicale des Carrossiers de Paris (Carriage Builders' Association) to represent that body as delegates at the approaching Automobile Salon (show) in October in Paris.

A new gray body color is named Caen Gray, after the caen stone, most likely.

There is a French green named Lewis Berger light green.

Cane work, imitation, is becoming quite popular for body work.

Paint Shop

EVER INTERESTING SUBJECT OF GLUE

Odor and Glue.—When the average person thinks of glue he thinks of odor, and right at the start we want to correct this idea, and "defend the smell." Glue and gelatine are nitrogenous substances procured from animal matter by the partial decomposition of hides, bones, sinews and other waste tissues through the agency of water and heat.

The lesson we wish to drive home is that these animal products, glue and gelatine, will not permit of overheating, nor of filthy conditions which favor bacterial growth. It is a matter of dollars and cents, and is deserving of study and attention. Practically all glue difficulties may be laid at the door of improper heat conditions or conditions favoring decomposition.

Keep in Dry Storage.—Remember, glue will keep perfectly for many years, as long as it is dry. If it is in a wet or damp state that bacterial action begins; so don't cook glue until ready to use, expecting to hold it in jelly form.

Grades of Glue.—Both glue and gelatine are manufactured from animal tissues, principally bones, hides and sinews. Generally speaking, the weaker and cheaper grades are made from bone stock and the better qualities from hide stock.

Fit Glue to Work.—Each class of business requires special grades of glue and each manufacturer in his respective line requires glue with qualities differing from those demanded by some other manufacturer in the same line.

This state of affairs makes the glue problem extremely complicated, and it is necessary that the user take the glue manufacturer into his confidence and avail himself of every opportunity to study conditions so he may meet them with the proper grade for the work. A doctor could not administer to a patient unless he were allowed to first diagnose the case.

There are two methods of dissolving glue or gelatine.

The Soak-First Method.—First, by soaking in cold water form one to eight or ten hours and then putting in a double cooker and bringing to a slow heat; do not let the temperature rise to above 140 degrees Fahr.

If it dissolves at a lower temperature, there is no need of allowing it to get hotter. Any temperature up around 125 degrees Fahr. is suffciently hot for application to the work. There has been a general idea among glue users that the hotter the glue the better the bond. The only aid hot glue is to good work is that it is thin and more penetrating; also the more heat there is (either in the glue or the stock), the longer it will be before the glue chills and becomes unworkable.

However, high temperatures spoil glue, a momentary rise of temperature up in the neighborhood of 190 degrees Fahr. in some instances destroying fully 25 per cent. of the strength of the glue. The longer the high heat is maintained the greater the damage. A day's cooking of glue at the "safe" point of 140 degrees Fahr. is liable to injure it to the extent of 50 per cent.

So be sure and not allow the men to hold dissolved glue from one day to the next. It is even better to dissolve twice a day. Some users secure better results on hardwood with an 8c glue than others using a 14c grade. It is all in the handling.

Don't soak the glue too long. The length of time depends on the form of the glue; that is, thin-cut or thick-cut flake, whole sheet, ribbon, or ground glue. In the case of sheet glues, break the pieces before putting to soak. This can be done without waste by placing in a bag and pounding.

The smaller the particles the quicker will they soak thoroughly. Take whatever style of glue you are using and determine how long it takes to thoroughly soak. If it is ground try some of the largest particles and find out if you can mash them between the fingers.

Be sure and determine that the centers of the particles are not hard (unsoaked). In the case of flake or sheet glues, after the glue has been soaking for some time, take one of the thicker pieces and cut with a knife to determine if the centers have softened up. As soon as the entire piece has softened the glue is ready for the cooker.

The Dry-Cooking Method.—The second method of dissolving glue is to add ground glue or thin flakes to the hot water in double cooker and subject to constant stirring, not occasional stirring.

If the glue under this process of dissolving is not kept in constant and vigorous agitation, a gummy coating will form around the outside of each particle or flake, which will prevent the dry glue within from dissolving. Of course the glue liquor already formed will not be of the proper consistency or strength for working and accordingly the entire pot of glue will have to be kept hot for a longer period than under the "soak-first" method.

However, one objectionable feature of the "soak-first" method might tend to offset the greater length of time required to cook by the "dry-cooking" method. This feature is that while the glue is soaking, especially in warm weather, bacterial action will detract somewhat from the strength of the glue.

Of course, as soon as the soaked glue is put into the double cooker and brought to the required heat the bacteria will be destroyed, but whatever harm they have done to the glue while soaking cannot be rectified. We think the "soak-first" method the more practical for the average factory. In employing the "dry-cooking" method let the water in the cooker come to a temperature of from 80 to 90 degrees Fahr. before adding the dry glue.

With either method of reducing glue, be sure and equip with up-to-date cookers, soaking pails, etc. Iron equipment of any sort is bad when the iron comes in contact with the glue, as iron rusts, and rust is very harmful to the quality of glue. Rust also discolors the liquor.

Evaporation.—Do not dissolve any glue, nor keep it hot for use, with the top of the cooker open. All pots should be equipped with covers to reduce as much as possible evaporation. Evaporation destroys the required proportion or balance of water and glue, upsetting the spreading, setting and drying qualities, and making it necessary to add more water. When water is added after the glue is once dissolved there is no way of knowing how much to add, and the proper strength in the liquor cannot be maintained. The oftener the glue is thinned the more liability of destroying the proportion.

Protect from Steam.—Admit no steam to the glue, even preventing it from coming in contact with the surface of the glue in the pots, as steam contains acids from the boiler compounds, also rust and pipe grease, any of which weakens the glue and discolors it, the acids sometimes turning a pot of good glue black. Speaking of glue turning black, green wood, containing tannic acid, can also turn glue black in the joints. The only other cause we know of for glue turning black is from decomposition, the acids generated by the bacteria as organic waste affecting the glutin.

Clean Pots Daily.—Gluepots and cooker should be cleaned thoroughly, inside and outside, each day. A little spoiled glue left on the side of the pot or cooker, from the previous day, might spoil the entire contents.

Pure Soft Water.—Always use clean soft water for dissolv-

ing and thinning glue or gelatine. Never use water from the boilers or glue cookers.

Foaming.—Speaking of the paper-box manufacturer, he often has trouble with glue foaming. This may be overcome by the addition of a little oil to the liquid glue—sweet oil, vaseline, or even machine oil. However, the company manufactures acid-free glues that are guaranteed not to foam, froth or scum. Overheating glue also causes it to foam.

Heating Stock.—The materials to be joined should be heated, especially in cold weather. First, to drive moisture from the pores of the stock so glue may penetrate and bond properly; and second, so hot glue when applied will not chill and lose its effectiveness. If the stock is cold the glue when applied is chilled, and thickens up, so the parts to be joined cannot be brought in close contact, which is necessary for good glue work.

Clean Stock.—Remove all dust and particles of every sort from the parts to be glued; the pores must be open so as to permit of the glue penetrating and getting a good hold on the surfaces. If the parts to be united are greasy, be sure to remove the grease with weak lime water or a similar solution.

Drafts of Air.—Avoid drafts in the shop where glue is being used, as the stock is liable to be chilled, causing the glue to set sometimes too quickly, but of most importance, to dry unevenly, and as in cases like laying veneers, the stock will warp and a perfect bond is impossible.

Keep Factory Warm.—The quicker the glue cools or chills after being applied to the work the earlier must the glued pieces be put in the presses. As a usual thing it is best not to build stacks (as in the case of veneer work) that require more than five or six minutes to build, as the first pieces glued may chill too much before going to the press to allow a good contact and the bond becoming established.

Setting Qualities.—Similarly, in factories where quick setting of the glue is desirable, and provided your glue manufacturer cannot furnish you with a quick-setting glue, it is well to pay attention to temperature, keeping the room as cool as possible, which will cause the glue to set more quickly. In this connection, the Clarkson Glue Co. has had people tell it that a glue can be made to set more rapidly by adding a small proportion of turpentine to the liquid glue. If this is effective it could be used in other lines of business.

To Make Glue Flexible.—Similarly, if a glue is too brittle, the addition of a small proportion of glycerine to the glue will render it more flexible after drying. This is a good point for emery and sand-belt users to bear in mind.

GOLD PAINT

For striping or ornamenting bodies where the effort is to produce a good effect at small cost gold paints are useful to the painter. They can be had ready prepared, but if it is desired to make them in the shop the following formulas are said to be good.

Stir the fine metallic powder into copal varnish previously thinned down to the proper consistency with turpentine. (2) Brannt gives the following: Melt dammar with an alkaline carbonate and expose the melted, finly powdered mass for several months to a temperature of about 122 deg. F. The alkaline resin thus obtained is dissolved in a hydrocarbon below 302 deg. F. Any acid contained in the hydrocarbon is previously neutralized by the introduction of dry ammonia gas. The mixture of this lacquer with the bronze powder keeps for a long time. (3) Pour over 100 parts of dammar and a few pieces of glass in a bottle 900 parts of benzine. Pour off the solution from the fine sediment and glass, and suspend in it 300 to 400 parts of bronze powder. Fill in small bottles.

A gold paint or varnish may be made as follows: (1) Digest shellac, 16 parts; gum sandarach, mastic, of each 3 parts; gum gamboge, 2 parts, all bruised, with alcohol, 144 parts. (2) Artificial alizarine or garancine is to be digested in a glass vessel in three times its weight of alcohol for 12 hours, and pressed and filtered. A solution of clear orange-colored shellac in alcohol is next filtered and evaporated until it has the consistency of syrup. The latter is now covered with a layer of tincture of garancine, which permeates it. The slight brownish tinge of this varnish—a tinge absent from gold—may be corrected by a tincture of saffron. (3) Pulverize 1 dram of saffron and ½ dram of dragon's blood, and put them into 1 pint 90 per cent. alcohol; add 2 ounces of gum shellac and 2 drams of socotrine aloes; dissolve the whole by gentle heat. Yellow painted work varnished with this mixture will appear almost equal to gold.

WHERE PIGMENTS COME FROM

The cochineal insects furnish a great many of the very fine colors. Among them are the gorgeous carmine, the crimson, scarlet carmine and purple lakes. The cuttle fish gives the sepia. It is the inky fluid which the fish discharges in order to render the water opaque when attacked. Indian yellow comes from the camel. Ivorp chips produce the ivory black and bone black. The exquisite Prussian blue is made from fusing horse hoofs and other refuse animal matter with impure potassium carbonate. This color was discovered accidentally. Various lakes are derived from roots, barks and gums. Blue black comes from the charcoal of the vine stock. Lamp black is the soot from certain resinous substances. Turkey red is made from the madder plant, which grows in Hindostan. The yellow sap of a tree of Siam produces gamboge. The natives catch the sap in cocoanut shells. Raw sienna is the natural earth from the neighborhood of Sienna, Italy. Raw umber is also an earth found near Umbria and burned. India ink is made from burned camphor. The Chinese are the only manufacturers of this ink, and they will not reveal the secret of its manufacture. Mastic is made from the gum of the mastic tree, which grows in the Grecian Archipelago. Bister is the soot of wood ashes. Very little ultramarine is found in the market. It is obtained from precious lapus lazuli and commands a fabulous price. Chinese white is zinc, scarlet is iodide of mercury, and native vermilion is from the quicksilver ore called cinnabar.

PAINTING AN AUTOMOBILE

The pigments used for color effects by the coach painter may be placed in two broad categories, those which are manufactured from or by the help of dyes and those which are found, chiefly mineral, in a natural state. The work of the chemist has placed at the service of the commercial world a variety of dyes which have greatly changed the processes of color manufacture and natural products are not depended upon to the same extent for many of the finer colors, especially those which are known in the trade as glaze colors, pigments which have not sufficient body in themselves to be used alone, but which have to be glazed over a substantial foundation of some other pigment, sufficiently near in shade to support and bear out the thin over-color. Not all the manufactured colors are of this nature: white lead, prussian blue, and vermilion are pigments of great potency, and are used for admixture with others or alone. The various earths which owe their color to the presence of oxides of metals, are also strong in their penetrative character. This difference in the character of the pigments ordinarily used is responsible in some measure for the apparent difference in the wearing qualities of the finished work. Some colors stand better than others when applied to the purpose of decorating a motor car. For this reason deep blues, greens, in all the darker shades, browns, deep cinnamon and red are recommended, the lighter tints and shades being liable to fade.

Ever since the introduction of the motor carriage an effort has been made to find some color, different from those in general use, which would differentiate the motor carriage from the horse-drawn one, and various colors have been employed with this object; the lighter yellows, special greens, and those

colors on which violet or purple is employed to obtain the desired effect. None of these colors is regarded as belonging to the permanent ones, and when used for motor-carriage decoration has not given entire satisfaction to the owner.

It is frequently overlooked that the motor carriage is not destined to be regarded as a stationary object to be closely examined and admired for the beautiful depth of its brilliantly varnished panels. It is a practical machine for everyday use, and its effective decoration must not depend upon the angle at which the light strikes the panels, so that the delicate tones of some subtle combination may be fully revealed. There is a vast range of effective color between the deep violets, which look like black at a distance of a few feet, and the yellow-tinged whites, which change color after a few months' use.

The first object of applying pigments to the outer panels of a motor carriage is preservation of the material from the effects of exposure to the weather, the second decoration. The first is easily attained, the second is more difficult, for the form plays the larger part in deciding whether a color is merely effective or wholly artistic in its appearance, for the colors are laid on in broad, well-defined masses. In other words, what is highly suitable for one form of car would have a very inartistic effect if applied to another, and the circumstances must guide the judgment in deciding upon the principal color to be used in the decorative scheme. It might be desirable to emphasize the form and outline of the body and upper structure of the car, subordinating the lower and less connected parts. The upper part of the car might be of such a size that a better artistic effect would be produced by the use of low-toned colors on the body and bright attractive ones on the under-parts, giving them sufficient prominence to balance the whole. There is no universal form or size for the motor carriage, and individual taste and requirements demand different proportions in the larger masses of form which generally carry broad color effects, and in selecting a decorative scheme the whole of the complete car has to be considered so that all the component parts bring their quota of form and color to the making of the artistically decorated motor carriage.

OIL, TURPENTINE, JAPAN

These are the principal ingredients used in making pigments. Varnishes of all kinds and patent oils and benzine are used for special purposes, but not when durability is wanted.

Linseed oil dries with a very glossy finish, and will therefore insure a glossy surface to any color to which it is added. It is the only vehicle used in mixing colors for the first or priming coat.

Japan is a liquid which is used to cause colors to dry. There are a great many different kinds and qualities. It is always advisable to obtain the very best grade for the best work. For cheap, temporary sign work, however, the cheaper qualities may be used advantageously. Japans do not add to the durability of the color; instead, they have just the opposite effect. The better the quality, however, the less harmful. Japan should always be used very sparingly. Usually a teaspoonful is sufficient for a pint of color. The cheapest and lowest grades of japan usually dry the quickest.

The purpose for which turpentine is used among painters and letterers is also too generally known to require much comment. It is used principally to thin colors to the required consistency. When a glossy finish is desired, turpentine should be used in very small quantities, as it has the effect of flatting or deadening the color or surface if used too freely. When a "flat" ground work is desired, turpentine should be used almost exclusively. Japan colors are also flat colors and should always be thinned with turpentine. Upon temporary work, such as muslin, benzine or gasoline may be substituted for turpentine.

Colors ground or mixed with oil, if allowed to stand for any considerable time, soon form a thick, tough skin over the top. This is the result of the oil rising to the surface and then drying. Before the color is again used this coating or skin must be entirely removed, for if any portion of it becomes mixed with the color it will be necessary to strain the color. Colors mixed or ground in japan, when exposed for any length of time, form a thin, brittle skin on top, which must also be removed before using. To prevent this, all colors in oil or japan should be kept either air tight or covered with a little turpentine or water when not in use.

PAINT AND PAINTING DEFECTS

This is the title of a book of 174 pages issued in "The Decorator" series of practical books, edited by A. S. Jennings.

The present book under notice is No. 9 of the series and is from the pen and experience of J. Cruikshank Smith, B.Sc., F.C.S. It is published by the Trade Papers Pub. Co., Ltd., 365 Berkbeck Bank Chambers, W. C., London, and may be had in America at the office of the Painters' Magazine in New York City.

The subject treated by the author is always an interesting one, but in the present instance the mural and house painter is the one who would be the greater benefited by the treatment of the subject, although the author has much of value to say about varnish and its difficulties. The subject of varnishing on metal is of interest to body painters at the present time.

We think Mr. Smith has used most of the matter serially at times in publications, and if of value there, it is yet more so in its present tabulated form. The English price is three shillings, six pence, which the American agent will transmute into $1, we presume. It is a dollar's worth to a painter.

DRYER FOR PAINT

A formula to serve as a type, or basis, for experiment directs to mix thoroughly and pass three or four times through a paint mill, 15 pounds dry sulphate of zinc, 4 pounds sugar of lead, 7 pounds litharge with sufficient linseed oil; keep in airtight containers.

Here are some others from various sources: 2. Japan Dryer —Into 1 gallon linseed oil put ¾ pound gum shellac; ¼ pound each litharge, burn umber, and red lead; and 6 ounces sugar of lead. Boil together for four hours, or until all the ingredients are dissolved. Remove from the fire and add 1 gallon spirits of turpentine.

3. Japan Dryer (cheap)—Mix together 4 gallons pure linseed oil; 4 pounds each litharge and red lead, and 2 pounds powdered raw umber. Boil slowly for two hours, add by degrees 7½ pounds of shellac, and boil ½ hour longer; when well mixed, add by degrees 1 pound powdered sulphate of zinc, and when nearly cold mix in thoroughly 7 gallons spirits of turpentine.

4. A dryer for zinc white is made by mixing together thoroughly 10 parts each sulphat of manganese, acetate of manganese and sulphate of zinc, with 14¾ parts of zinc white. An addition of 2 or 3 per cent. of this dryer to zinc white oil paint will make it dry hard.

RULES FOR USING GLUE

Glue, being an animal substance, must be kept sweet; to do this it is necessary to keep it cool after it is once dissolved, and not in use. In all cases keep the glue kettle clean and sweet, by cleaning it often. Good glue requires more water than poor, consequently you cannot dissolve six pounds of good glue in the same quantity of water you can six pounds of poor. The best glue will require from one-half to more than double the water that is required with poor glue, which is clear and red, and the quality of which can be discovered by breaking a piece. If good, it will break hard and tough, and when broken will be irregular on the broken edge. If poor, it will break comparatively easy, leaving a smooth, straight edge. In dissolving glue, it is best to weigh the glue, and weigh or measure the water. If not done, there is a liability of getting more glue than the water can properly dissolve.

It is a good plan, when once the quantity of water that any sample of glue will take up has been ascertained, to put the glue and water together at least six hours before heat is applied, and if it is not soft enough then, let it remain longer in soak, for there is no danger of good glue remaining in pure water, even for 48 hours. The advantage of frozen glue is that it can be made up at once, on account of it being so porous. Frozen glue of same grade is as strong as if dried. If glue is of first rate quality it can be used on most kinds of woodwork very thin, and make the joint as strong as the original. White glue is made white by bleaching.

COLD LIQUID GLUE

To make glue liquid in the cold, nitric acid is generally added; thus we may take glue, 8 parts; water, 8 parts; nitric acid, 2½ parts. The nitric acid may be replaced by acetic acid. Thus an excellent liquid gum is made by dissolving one part of glue in two parts of vinegar.

Another process consists in dissolving by the aid of heat, 30 parts of glue in 80 parts of water, and immediately adding 5 parts of hydrochloric acid and 7 parts of zinc sulphate. A very strong liquid glue is obtained by the action of caustic soda upon glue. The following proportions are used: Glue, 1,000 parts; water, 1,500 parts; commercial caustic soda, 40 parts.

WATERPROOF PAINT SUBSTITUTE

A fire-proof and water-proof substitute for paint, for use in boiler and engine rooms, consists of six quarts of freshly slaked lime, well sifted, to which is added one quart of rock salt and a gallon of water, the mixture being then well boiled and skimmed clean. To five gallons of this mixture are added a pound of alum, half a pound of copperas (stirred in slowly), three-quarters of a pound of potash, and four quarts of fine sand or hardwood ashes, well sifted. To this may be added any coloring material desired. It is said to be as durable as slate, and to be especially applicable to brick work and similar surfaces.

TO SOFTEN PUTTY

Hard putty may be softened by means of a paste of equal parts of caustic potash and powdered fresh quicklime mixed with water and a little soft soap. The paste is applied over the hard putty. A similar paste is composed of three parts quicklime slaked in water and one part pearl ash reduced to the consistency of paint. Soft soap is also efficient for the same purpose. It requires about twelve hours.

TO SOFTEN PAINT

If two parts of ammonia are shaken up with one part of spirits of turpentine, a permanent emulsion will be formed which, when applied to old paint or varnish, will soften it so much that in a few minutes it can readily be scraped or rubbed away.

TO THICKEN MIXED COLOR

To restore a batch of color to the proper consistency that has been accidently made too thin, procure a pasteboard box, into which pour the color and allow to stand a few moments. When sufficient of the vehicle has been absorbed to render the color the desired consistency, immediately pour back into the original receptacle, when it is ready for use.

CARMINE, VERDIGRIS AND YELLOW LAKE

These colors are classified as staining or glazing colors. They have no covering qualities whatever. They are exceedingly transparent and brilliant, presenting very bright and beautiful effects when held to the light. They are used principally with shading and to obtain pretty effects in glass work. Carmine is a rich, brilliant, blood red. Verdigris is a light, bluish green, and yellow lake is a rich yellow.

SIMPLE TEST FOR LINSEED OIL

A simple practical test for linseed oil is to mix the sample with three times its weight of genuine white lead, and cover a perfectly clean glass or metal surface with the paint. An exactly similar experiment is made simultaneously with a standard sample, and the rates of drying and characters of the coating of paint compared. Very small admixtures of rape or other non-drying oils retard the drying considerably.

KUKUI NUT OIL FOR VARNISH

Reports from manufacturers of varnish in various cities upon samples of kukui nut oil sent from the Hawaii experiment station are to the effect that it is far better than linseed oil for making varnish, and a Philadelphia factory is willing to buy 10,000 gallons of the oil a year.

RUSTPROOF VARNISH

A varnish which will resist rust may be made by dissolving ½ lb. of asphaltum and the same quantity of powdered resin in about 2 lbs. of tar oil. Mix hot in an iron kettle, taking care to prevent any contact with the flame. When cold the varnish is ready for use.

SYSTEM

Proper distribution of overhead charges, accurate time study and charges, accurate material charges, controlled from a central point in which all is charged against its proper account by the same mental interpretation is the only accurate way, combined with a symbol method, not too complicated, which places the burdens where they belong at the time the expense is incurred.

Unless raw and worked materials are properly accounted for, it is impossible to tell "where you are at" so that the truthful conduct of a stockroom is another important and necessary function outside of the workman. Store records should be complete and show enough information to gage efficiency without being so complicated and cumbersome as to require more time to tell the story than an inventory.

Maximums and minimums should be so proportioned as to allow a minimum amount of capital being tied up in fixtures, stock, raw materials and work in process as well as all materials spoiled or defective.

QUALITY OF WORK

We must continue in our manufacturing to put the same interest into the quality of our work if we intend to remain supreme.

Every green workman broken in means sacrifice in profits, quality and volume of output. Therefore, ideal factory conditions rest almost entirely on one basic principle which is: Constant volume of output. It is not always possible to maintain this owing to conditions that may arise, such as the matter of orders, capital, and the proper supply of materials and help. We should, however, try as these weak spots develop, to build them up in such a way as to make conditions tending toward constant volume of output, as nearly perfect as possible.

It is far better to work at a steady, even gait for a year than to intensify the production to a point where all the work is done in six months and your factory is idle for the remaining six months.

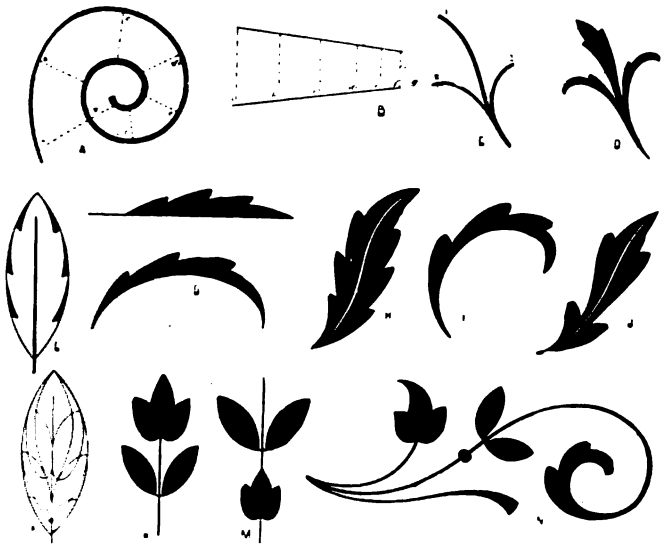
THE FOUNDATION LINES OF SCROLL WORK

The coach body painter should understand that all ornament is based on natural forms which become conventionally rendered, and one of the chief forms is the spiral shown in A.

Several of these of various sizes growing out of each other form the ground work or skeleton lines of many beautiful designs. In the drawing of this line it will be observed that the space between the lines decreases as it approaches the center, the dotted lines (a to g) gradually getting shorter. In fact, the line marked (g) is less than half the length of the line (a). B gives a good idea of the diminishing space, supposing it were straightened out.

Next in importance is the branching of lines out of each other. No abrupt junctions or bends should occur. C will give a fairly good idea of how the lines should grow out of each other. There is a main line (1), and from it (2) and (3) radiate on each side; the three lines should be perfect in curve and complete without each other. To take an illustration from everyday life, consider line (1) a railway track, and (2) and (3) lines branching therefrom; fancy an express train running any of these curves at thirty miles an hour: little more need be said about the necessity of trueness of curves.

If these three curves are thickened at the ends as in D, an ornament is at once made. Forms from foliage are best for



ornament. In E a leaf is divided on the edge like a rose leaf. If half of this is taken such an ornament as F is obtained. If it were bent into a curve it would look like G. If the whole leaf were bent H would result, and each side of it could be used as a detail of ornament. If half the leaf were lengthened a little and still more curved, like I, many curved lines could be obtained, or if some of the leaf were left off, as in J, still more grace would result.

Diagram K is worth study. All the outside lines are carried to the center stem, it will be seen, showing how the outside curves of all the foregoing leaves are obtained. Within the lines a number of ornamental forms can be traced, some of which are made use of in L and M.

It only remains to place these various forms in combination, after knowing how to draw them correctly, to find pleasing combinations. In a simple way this is shown in N, all of which is taken from some part of the preceding forms. The main spiral is thickened like Fig. 1, the leaf forms half-way along the surve are found in K, and the upper branching line also comes from K. All that is added are the circle on the central line, and the thickening of lower branching line. It is then only a matter of ground lines of curves and spirals, with details of ornaments such as shown.

By such studies the wagon painter will make his work natural, graceful, successful.

COACH COLORS AND APPOINTMENTS

An interesting communication from an English reader, found in The Rider and Driver, is worth repeating, if only to keep in mind some facts about body painting, liveries, and such details that make for the refinement of the trade, and give a reason for what may seem to some without reason.

It is curious how few people (even judges at shows) know that the color of appointments is not a matter of the individual fancy, or artistic taste, of the exhibitor, but is entirely arbitrary.

The only colors allowed are those of the first two colors (or, to speak heraldically, "metal and tincture" of the exhibitor's coat of arms.

It does not do to say that the United States is a republic, and, therefore, its citizens have no coat of arms.

Appointments are monarchial, not republican, so if a man exhibits in an appointment class with coachman and footman in livery, he cannot be judged on republican lines.

The only colors allowed, therefore, are as I have described above.

A coat of arms consists of colors (called tinctures) and yellow and white, which represent gold and silver and are called the metals.

The tinctures are red, blue, green, black (and rarely orange and violet).

A color cannot be put on a color or a metal on metal and there must be a metal in a coat of arms.

In describing a coat of arms the main color, or metal, of the shield is described first, and then the principal metal or color, which is superimposed on the shield either in a quartering or a band or what not.

Therefore, suppose Mr. Jones' coat of arms is silver with a blue band, and other objects on his shield.

The silver and blue are his proper colors for appointments and what he can use is:

White, silver, buff, gray, various shades of blue and black.

White or silver (as gold or yellow) are interchangeable in heraldry.

I will explain later why he may use buff, gray or black. For state carriage, footman with powdered hair, coachman with curled white wig, hammer cloth, etc., he must paint as follows:

White panels, pale blue wheels and under carriage with white lines, hammer cloth pale blue with his coat of arms on it in full colors and also on the door panels, harness pads white with blue border, blue and white rosettes, coachman in white livery with blue breeches and white stockings.

All harness furniture, livery buttons and wheel boxes, etc., of silver.

In fact, white must be the principal color and pale blue only used sparingly.

Now for dress occasions, other than state occasions, he can have chiefly dark blue and less white, the carriage to have only his crest, in blue on white, or white in blue, and of a small size, the same on the livery buttons; on the Continent of Europe, other than England, the livery would still be white with blue collar and cuffs and pocket lapels.

Now comes in the buff or gray.

As a white livery is too gaudy and too easily soiled for every day use, in England, buff or gray is considered to represent white, and the carriage may be blue, picked out with white.

(Unfortunately, this dark blue picked out with white is now being used for funeral carriages.)

Black can be used sparingly for all families. On the Continent the coat of arms is repeated in a continuous strip on a narrow silk ribbon, which is used as a binding to the livery, or sometimes a thin piping instead of blue on the white livery.

Now another man, say Mr. Robinson, has gold and red as his first two heraldic colors.

For state occasions he has yellow panels and body with scarlet under-carriage and hammer cloth; his livery is canary color with scarlet breeches (stockings should by rights be yel-

low, but white for stockings is allowable, as yellow is so ugly), and so on, his buttons, on livery, harness, furniture, etc., being, of course, gold or brass.

In England he must not have scarlet livery except by special permission, as it is the Royal color.

For ordinary use he is allowed brown to represent the scarlet, so he can have a brown carriage, picked out more or less with red, or a red or black under-carriage; brown livery either with or without red collars and cuffs, etc.

The man who has green and gold as his colors should be gowned in the same way, or the man who has blue and gold, or red and silver, or green and silver, or black and gold, or black and white.

This practically exhausts the combinations.

For state, the coat of arms in its full colors; the crest in one color for semi-state, and the crest in one color for negligee use.

For state all three men have knee breeches and stockings. The coachman sits alone on the hammer cloth, and two footmen stand on the footboard behind.

THE BENZOLE INDUSTRY

The demand for more and cheaper gas engine fuel is beginning to tell abroad. Here are a few very interesting items.

The King paid a visit to the Birchenwood Colliery, and there inspected the huge benzole plant. This plant is one of the largest and most completely equipped in the kingdom, and is producing a perfect motor spirit and many other valuable by-products from coal at the pit mouth.

It is important to record that latest information is that, by the system in use at Birchenwood, it is said to be quite possible to extract as many as 20 gallons of spirit from cannel coal!

By means of the process in use at Birchenwood, Germany will be producing this time next year 800,000 gallons of benzole a week for use in that country. That renders Germany almost independent of imported fuel! Further, the German government has put down a plant—just completed—which is capable of producing 5,750,000 gallons a year.

AUTOMOBILES IN URUGUAY

Few South American cities, in proportion to the number of inhabitants, show as many automobiles in use as Montevideo, yet the number is increasing very considerably. During December and January no less than 115 high-priced cars entered this port and were sold. There are now more than 1,300 cars licensed in Montevideo, about 2,000 being the total for the whole republic. The main cause of this large number is the 100 miles of macadamized road which traverses a fine agricultural country. A motor car can negotiate all parts of the republic when the streams are not in flood.

Of the machines in use here, those of American manufacture are well represented, numbering about one-half of the total. They give every satisfaction, the only criticism being that delivery is not made rapidly enough; many orders are now awaiting the arrival of cars, some of which are partly paid for. It is extremely doubtful if there is a better market for the sale of American automobiles anywhere at present than Uruguay.

WIDE DISTRIBUTION OF AUTOMOBILE EXPORTS

American manufactures are now finding markets in every country and colony of the world. More than 100 countries, colonies, and dependencies are included in the list of world communities to which the products of the United States are distributed, and manufactures go to practically all of them. Take as an example the automobile, a comparatively recent factor in commerce. The number of countries and colonies to which automobiles were exported from the United States last year is over 70, including the Canary Islands, the Dutch East Indies, French islands in the Pacific, Portuguese possessions in Africa, Turkey in Asia, Siam, French Guiana, each of the Central American Republics, practically all of the South American countries, and all of the countries of Europe, including Bulgaria, Roumania, Servia, and Montenegro. The aeroplane, a still more recent contribution to international commerce, went as an article of export last year to Japan, Brazil, Russia, Panama, France, Germany, Canada, Cuba, the Philippine Islands, Jamaica, and Australia.

CHANGES

William Montague Perrett, manager of the Detroit branch of the Empire Tire & Rubber Co., of Trenton, N. J., retired from the Empire service May 1, at which time he rounded out five years in that position; Perrett will engage in other lines of work.

L. C. Havener has been appointed manager of a newly opened branch of the United States Tire Co., in Worcester, Mass. Havener has been connected with the trade for many years and is a resident of the city of his new connection.

A. J. Kelly has been appointed manager of the Goodrich branch in Worcester, Mass. Previously he had charge of the Goodrich establishment in Syracuse, N. Y.

May 1, the Firestone Tire & Rubber Co., of Akron, Ohio, opened a factory branch in Syracuse, N. Y., at 502-504 East Genesee street, with E. A. Hoffman, formerly of Syracuse and later connected with Wyckoff, Church & Partridge, of New York City, in charge. Charles M. White, Jr., who has been representing the Firestone line in Syracuse, will become a factory representative in Detroit.

NATIONAL SHOW ELECTS DIRECTORS

The annual meeting of the stockholders of National Implement and Vehicle Show Association held in Peoria, April 12, was a very enthusiastic gathering. There was a large attendance and everybody was hopeful and looking for big things.

The directors elected were as follows: J. B. Bartholomew, D. H. Bethard, H. I. Battles, H. H. Block, W. G. Causey, Gerald B. Franks, LeRoy Page, W. O. Ireland, H. R. Herschel, E. C. Heidrich, Jr., E. G. Isch, H. B. Morgan, J. W. McDowell, Geo. T. Page, Warren Sutliff, A. J. Tapping, Lewis Hines, R. R. Bush, C. A. Pattison.

CHEAPER FUEL FOR MOTOR CARS

According to the Manchester Guardian, a mixture of gasoline and paraffin has been submitted to tests by the British Motor Cab Co. and been found most satisfactory. The cost works out at 21 cents per gallon, and the fuel has been found practicable for car-running purposes by means of a starting device which the company has just patented. The general manager says that the company now has 1,250 cabs running on the mixture and with the starting device, and that better mileage is obtained than with petrol or gasoline. The reduced cost of the new fuel may pave the way for a settlement of a dispute between the owners and the drivers of taxicabs.

BAIN GETS FISH MEN

The Bain Wagon Co., Kenosha, Wis., has engaged Charles Meyer and F. W. Allen, well known wagon men who have been connected with the Fish Bros. Wagon Co., Racine, Wis., for many years. Mr. Meyers had charge of sales for Fish Bros. Co. and is now in the sales department with the Bain Co. Mr. Allen represented the Fish Co. in Kentucky, Tennessee and Alabama with headquarters at Nashville, and he is in charge of the same territory for the Bain Co.

Wood-working Shop

CARING FOR BELTS

If a machine stands idle during working hours while the belt is being repaired or tightened, it produces nothing during that time, and there is a loss of output. If it stands idle for ½ hour in 10 hours' working time there is a loss of 5 per cent. in its output.

This is not so serious as the loss in output due to belts being run so loose that they cannot take the speeds for which the machines were designed and that the tools will stand. Almost every efficiency engineer, in attempting to bring up the speeds of his machines to what he knows is possible, has found that such attempts usually result in the belts slipping and breaking, or the lacings giving out, and he knows that where the care of belts is left to the man on the machine, in only a very few cases can the belts be depended on to do the maximum amount of work.

Belts of the best quality must be used at proper tension, and they must be kept in first class condition and inspected outside of working hours. Very few machinists, or even foremen, know how to tighten or lace a belt properly, the amount to be taken out being usually guessed at, and much time is lost through the machines standing idle while the cutting and trying is going on.

It is safe to cut belts 2 inches short in every 10 feet of measured length. To lace with leather lacings, butt the ends of the belt together, being careful that the edges are cut exactly at right angles to the belt. Holes should then be cut in the belt with an oval punch, making the larger diameter of oval parallel with the side of the belt.

Belts put on too tight produce excessive strain on the pulley bearing and consequent loss of power and output. Belt clamps having spring balances between the pair of clamps, should be used for measuring the tension accurately each time the belt is tightened. They should be tightened in this manner to give the following pressure per inch of width, with an arc of contact of 180 degrees: 3-ply about 47 pounds, 4-ply about 57 pounds, 5-ply about 63 pounds, 6-ply about 70 pounds, 7-ply about 80 pounds, 8-ply about 95 pounds, 10-ply about 140 pounds.

Cemented splice, when properly made, give the best results, and are being adopted. The ends of the belts are beveled and then firmly cemented and rolled or pounded together and allowed to dry thoroughly before being run on the pulleys.

One of the most important points in the care of betls is to keep them clean. All belts should be examined frequently, and the greasy or dirty ones scraped to remove all surface dirt. They should then be washed with warm water and soap, care being taken that the water is not too hot to be uncomfortable to the hands.

Very dirty or greasy belts can be cleaned with a mixture of two parts of gasoline and one part of turpentine, but remember that this mixture is highly inflammable and must be kept away from open lights and fires; then scrape the loosened dirt off with an old file or dull knife, and wash again if you have not reached bare, clean leather. When the belt is dry it should be given a light, even coating of castor oil on the working side, and if very dry, on both sides.

A surface compound for belts is equal parts of red lead, black lead, French yellow and litharge. Mix with boiled linseed oil and add enough japan to make it dry quickly. A thin coating can be applied with a brush and should be allowed to dry before running the belt.

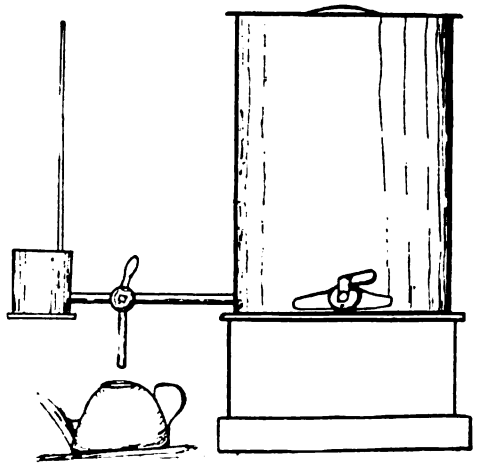
A shifter having rollers should be used when the belt is a wide one. These rollers should press against the flat of the belt, not the sides, thus avoiding heating and damaging of the edge of the belt. Near each pulley on the line shaft, where a belt drives a machine that is liable to stand idle for some time, a staple should be driven into the rafters or ceiling. A hook of ⅜-inch round iron should be hung from the staple; it should be made long enough to reach almost to the rim of the pulley, but a little to one side of it.

When a belt is taken off its pulley it should be hooked up by the belt stick, the slack of the belt allowing it to be caught on the hook. When the belt sags the hook should swing so as to make the belt clear the side of the pulley and also the shaft. This avoids the tying of belts to beams, hangers, etc., or of leaving them hanging on the revolving shaft, causing the belt to be worn through or weakened.

AN OIL CONTAINER AND MEASURER

Every shop has to store its lubricating oil after some fashion. Usually it is drawn from the barrel. In cold weather the oil runs slowly into a container and is more or less of a bother. An ingenious man has hit upon a plan to use such oil without waste, and with other advantages. We illustrate his idea.

As arranged, there is the large storage tank for the stock of lubricating oil, this tank being set well above the floor for ease in drawing off the oil. Attached to the large tank is a small one having any capacity most suitable. In this case the small



A Tank Attachment for Lubricating Oil

tank held one gallon. In some places a half gallon size would be more desirable, and it would be a convenience in some factories to have more than one small measuring tank. The scheme permits the use of several small ones arranged around the large one. In the connection pipe is a three-way valve, and to the tight cover of the small tank is fitted a small glass tube which extends to about the top level of the storage tank.

To operate the scheme, simply throw the three-way valve so that oil may flow from the storage tank into the small measuring tank. This is the normal position of the three-way valve so as to insure the measuring tank always being full at the time the oil is needed. Then set the oil can under the outlet and throw the three-way valve so as to empty the measuring can, and go about your other business. The scheme insures that no oil will be wasted, and it does not need an attendant to watch it.

SEASONING TIMBER

Every year increasing quantities of timber are being seasoned by artificial means, and in some countries a large industry has been created in response to the demand for plants to do this work. The saving of time is enormous compared with that required for natural seasoning. Drying in kilns occupies periods ranging from several days to two or three weeks, according to the size and condition of the material to be dealt with, which, if done naturally, would occupy as many years.

Natural seasoning, though so prolonged, does not yield better results than careful artificial seasoning. In fact, it is claimed that the latter is preferable as being more thorough and because the timber absorbs less moisture subsequently than does timber which is naturally dried. This is a point well worth considering from a coach builder's point of view. The essential difference between the two systems is that the natural system depends on the action of chance currents of air, whereas the other provides air currents of any desired intensity and volume with due regulation both of humidity and temperature to suit not only the different kinds and qualities of the timber, but also its varying condition in the different stages of drying. The details are thus of a highly technical character, and the success of the result depends to a large extent on the care and experience of the operator in charge.

The difference between green and seasoned timber is that the first contains a large quantity of free water occupying the cells, and organic matter in the living cells such as starches, sugars, resins, etc. Seasoning removes the greater portion of the water and breaks down and removes portions of these substances, which have much affinity for water. These substances are decomposed more effectually by the moist heat utilized in artificial seasoning than by the merely dry air currents of natural seasoning; hence the basis for the important claim that timber which is artificially dried absorbs less moisture subsequently from the atmosphere than that which is dried naturally. In brief, the art of drying timber in kilns consists in removing the greater portion of the water and a portion of the organic constituents as rapidly as possible without injury to the timber itself. Dry warm air alone would crack the timber and twist it. The air must be heavily laden with moisture in the early stages of the drying and to be dry only at the final stages.

HOW ABOUT BRAZIL FOR DECORATIVE VEHICLE WOODS?

Brazil is rich in fine woods little known that might be used by the vehicle body builder looking for new effects. Here is a brief account of some from among many that seem promising:

Peroba—There are various kinds of this wood, of which the most desirable is the peroba de Campo found in southern Brazil. The peroba rosa, amorella and peroba parda are used for structural purposes. The latter especially is used for parquet floors, for de luxe railway trains, and for floors in ship cabins. The wood is very hard and durable and has a beautiful brown color with more or less grain showing.

Vinhatico is fit for high class furniture, the colors ranging from light yellow to reddish yellow. The trunk of the tree attains an extraordinary thickness, sometimes from 8 to 10 feet diameter, and many trees furnish as much as 800 to 1,200 cubic feet of the finest wood.

Putumuju and Arrariba vermelha find uses for interior decorations both in houses as also on board ship. The wood is of a beautiful yellow color streaked with the same colored wood veins and grain, and the arrariba is of a brilliant red tone with dark grain.

Genipapo is a fine wood of grayish blue color, very suitable for interior finishing and decorations. The wood is easily worked and can be polished to a perfect luster.

A number of types are waterproof, among them the cangerana, which is also used in Brazil for railway ties, and the copahyba. The peroba revessa is also worthy of mention on account of the waveshaped grain showing through the wood, which makes it a desirable lumber for parlor floors.

There are also a few curiosities in this line, as for example, the pao jangada, which has an extremely low specific gravity and is used for medium sized boats and skiffs in which the natives venture many miles out to sea without fear. The specific gravity of this wood is between 0.20 and 0.25. Furniture made with this wood is almost indestructible.

Sassafreis is another wood which excels through its fine, penetrating odor and might be used for very fine woodworking.

CALCULATING SPEEDS

We will suppose the lineshaft runs 400 r.p.m., and we wish to install a planer and run it 4,000 r.p.m. The pulley on cylinder is 4 in. diameter, and on the countershaft 20 in. driver and 10 in. driven. What will be the size of pulley required on line shaft?

Cylinder pulley, 4 in., multiplied by 4,000 (its speed), equals 16,000; 16,000, divided by 20 in. (countershaft driver), equals 800, or speed of countershaft; 800, multiplied by 10 in. (countershaft driven), equals 8,000; 8,000 divided by 400 (line shaft speed), equals 20 in., or the size of pulley required on line shaft.

Next we will suppose we have all the pulleys, and wish to find how fast the planer will run: Line shaft pulley, 20 in., multiplied by 400 (its speed), equals 8,000; 8,000, divided by 10 in. (countershaft driven), equals 800, speed of countershaft; 800, multiplied by 20 in. (countershaft driver), equals 16,000; 16,000, divided by 4 in. (cylinder pulley), equals 4,000, or speed of cylinder.

Again, suppose we have the line shaft pulley, 20 in., and countershaft pulleys, 20 and 10 in., and wish to know the size of pulley required to run the cylinder 4,000 r.p.m.: Line shaft pulley, 20 in., multiplied by 400 (its speed), equals 8,000; 8,000, divided by 10 in. (countershaft driven), equals 800, speed of countershaft; 800, multiplied by 20 in. (countershaft driver), equals 16,000; 16,000, divided by 4,000 (cylinder speed), equals 4 in., or size of pulley required.

These are very simple problems, but the more difficult ones can be figured out by the same rule.

CLEANING MACHINES BY STEAM

Cleaning machines is such tedious, dirty, and often neglected work that anything which facilitates and encourages it should be hailed with more or less joy by both manufacturers and operators. It is admittedly a good thing to keep machines clean for the sake of the machines themselves. Also, it helps reduce the fire hazard and the insurance premium.

The insurance people themselves indorse the idea of using steam jets for cleaning. It is one of the most effective ways for cleaning dirty and greasy machinery. If you can get a line of steam piping into the building, then a length of steam hose that will enable you to reach all the different parts, all you need is some kind of a nozzle, which can often be made with a piece of steam pipe and be covered over with some insulating material, so that it can be handled without burning the hands.

Wherever you can get a jet of steam to a piece of machinery, shafting, journal box or pulley, the cleaning is very easy. The steam blows and washes the dirt out and cuts it out as clean as if one were to take gasoline or benzine, and does it much easier, and with much more safety.

Gasoline and benzine, with coal oil as a makeshift, are the general cleaning agents for machinery and machine parts that become foul with grease and dirt. There are some objections to the use of them, because of the fire hazard, and it is this that makes the steam jet very welcome. There is no danger of fire connected with it, and it is in keeping with modern ideas and methods all around. So, if you are in shape that you can

do it, try connecting up a steam hose and jet and using it for cleaning off the machines, shafting, and even the beams in the building.

"COLOMBIAN MAHOGANY"

The purpose is to present to users of cabinet woods the distinguishing characteristics of one of the best imitation mahoganies now marketed. The trade name of this wood is "Colombian mahogany," so called because it comes only from Colombia. It is not mahogany, however, but belongs to an entirely different family of trees, the monkey-pod family, and is technically known as Cariniana pyriformis. "Colombian mahogany" and true mahogany are botanically as unlike as an oak and a maple, but a superficial resemblance in the grain and color of their woods has made it possible to substitute the Colombian wood for the other.

Since Cariniana is not mahogany, the trade name "Colombian mahogany" is a misnomer. It is probable, however, that because the wood comes entirely from Colombia it will continue to be known by its present name.

How long the wood has been used in the United States is not known. It has been exported from Cartagena to Havre for more than 30 years and there sold in immense cargoes as genuine mahogany. The trunks of the trees are straight and cylindrical, from 24 to 70 inches in diameter, with an average of about 36 inches, and often with a clear length of 50 feet.

The great popularity of true mahogany as a finishing wood has caused a steady depletion of the available supply ever since its earliest use, in about 1724. Few users of mahogany realize that the consumption of material passing in the markets as mahogany amounts annually to about 40,000,000 feet, while the cut of real mahogany is only about 18,000,000 feet. This does not mean so much that deliberate deception is being practiced as it does that the demand for true mahogany greatly exceeds the supply.

SCREW HOLES IN WOODWORK

To fill up the holes left when flat-headed screws have been screwed down below the level of woodwork, it is a good plan to tin the heads and afterward place a daub of solder on them with a soldering iron. After the solder has been smoothed down with a file and painted, the hole will not be perceptible. Melting away the solder will permit the screw to be withdrawn when necessary.

NOW WITH THE MILLCREEK WAGON CO.

M. J. McNamara, popular Cincinnati vehicle man, is now with the sales department of the Millcreek Wagon Co. Mr. McNamara is capable, posted in the vehicle business, and is with a progressive institution.

TARIFFS FILED WITH I. C. C.

New tariffs have been filed with the Interstate Commerce Commission, naming rates on vehicles, carriages and parts, with the I. C. C. numbers, effective dates and rates in carloads per hundred pounds, unless otherwise stated. A, advance; R, reduction.

Atlantic Coast Line, Sup. 11 to I. C. C. No. A-1374, April 19. Carriages, buggies and trotting wagons from Wilson, N. C., to Stewart, Va., boxed or well crated package not exceeding 34 inches in height, L. C. L. $1.20, boxed or well crated package exceeding 34 inches but not exceeding 54 inches in height, L. C. L. $1.80, boxed or well crated C. L. 8,000 lbs. minimum 87¼ per 100 lbs. (R. S.) Wagons, farm or lumber ,from and to same points, taken apart and thoroughly K. D. L. C. L. 67c, S. U. or K. D. C. L., 20,000 lbs. minimum 44c. (R. S.)

Also Sup. 9 to I. C. C. No. A-681, April 21. Buggies, carriages and wagons released, from Greeneville, N. C., boxed or well crated package not exceeding 34 inches in height L. C. L. to Bainbridge, Ga., 98c (R); to Quincy and Tallahassee, Fla., $1.40; boxed or well crated package exceeding 34 inches but not exceeding 54 inches in height L. C. L. to Bainbridge, Ga., $1.47; to Quincy and Tallahassee, Fla., $2.10; boxed or well crated C. L. 8,000 lbs. to Bainbridge, 87c; to Quincy and Tallahassee, Fla., $1.25 (All R. S.)

Also Sup. 3 to I. C. C. No. A-2070, April 17. Carriages, buggies and trotting wagons from Washington, N. C., to Leake, N. C., boxed or well crated package not exceeding 34 inches in height K. D. less than carload 55½c; boxed or well crated package exceeding 34 inches but not exceeding 54 inches in height K. D. less than carload, 99c; boxed or well crated, C. L. 8,000 lbs. minimum except where otherwise specified, 36.4c (R.); to Rochelle, Ga., boxed or well crated package not exceeding 34 inches in height K. D. less than carload, $1.23; boxed, well crated package exceeding 34 inches in height, but not exceeding 54 inches in height K. D. less than carload, $1.72; boxed or well crated carload, 8,000 lbs. minimum except where otherwise specified, $1.05.

Cameron, Wm. Sup. 1 to I. C. C. No. D-71, April 7. Dump carts, farm carts, farm wagons from St. Louis, Mo., to Boston, Mass., New York, N. Y., 23c; Philadelphia, Pa., 23c; Baltimore, Md., 22c; from Cairo and Thebas, Ill., to Boston, Mass., and New York, N. Y., 28c; Philadelphia and Baltimore, 27c. (R.)

Chicago, Burlington & Quincy, Sup. 7 to I. C. C. No. 10625, May 1. Wagons (not pleasure or passenger vehicles) and parts thereof, farm trucks and parts thereof, between Des Moines, Ia., and Kansas City, Mo., Leavenworth, Kas., Atchison, Kas., and St. Joseph, Mo., 21c.

Also I. C. C. to 10758, April 25. Wagons (not pleasure or passenger vehicles) and parts thereof, farm wagons, farm trucks, wagon seat springs, to Sioux Falls, S. D., from Chillicothe and Edina, Mo., 31c; Fairfield, Ia., 28c; Green City, Mo., 31c; Oskaloosa, Ia., 27.c; Ottumwa, Ia., 27.3c; Shenandoah, Ia., 25c; Tarkio, Mo., 31c; Wheeling, Mo., 31c.

New York Central & Hudson River, I. C. C. No. B-18540, April 10. Vehicles N. O. S. (not self-propelling) from Watertown, N. Y., to Caribou, Fort Kent, 71½c; Grand Isle, 71½c; Houlton, 68½c; Presque Isle, 71½c; St. John, Me., 78½c (also rates to other Maine points).

Also I. C. C. No. 3263, April 1. Articles classified in Western Classification No. 51 issued by F. J. Hoffman, Agent, as vehicles (except self-propelling vehicles) children's vehicles and hearses and parts thereof, also farm wagons, wagon seat springs, to Calumet, Mich., from Chicago, Ill., Milwaukee, Wis., and Minneapolis and St. Paul, Minn., 31c; to Houghton, Mich., from Chicago, Ill., Milwaukee, Wis., 25c, and from Minneapolis and St. Paul, Minn., 25c; to Lake Linden, Mich., from Chicago, Ill., Milwaukee, Wis., and Minneapolis and St. Paul, Minn., 30c (reductions in rates from Chicago, Ill., and Milwaukee, Wis.)

Chicago & Northwestern, Sup. 7 to I. C. C. No. 7337, April 15. Iron wheels, for agricultural implements, from Davenport, Ia., to Sterling, Ill. (Rock Falls), 5c. (R.)

Chesapeake & Ohio of Indiana, I. C. C. No. 87, April 10. Poles, carriage or wagon, in the white S. U. and shafts, carriage or wagon, in the white S. U. in bundles from Muncie, Ind., to Freeport and Rockford, Ill., 26c; based on rate of 14c to Chicago or Joliet, Ill. Poles, buggy, ironed in the white, S. U., and shafts, buggy, ironed in the white S. U. from Muncie, Ind., to Freeport, Ill., 21c; basis 14c to Chicago or Joliet, Ill. Vehicle wheels from Muncie, Ind., to Moline, Ill., 26c.

Chicago, St. Paul, Minneapolis & Omaha, Sup. 10 to I. C. C. No. 3833, April 16. Buggies, K. D. L. C. L. from Sioux Falls, S. D., to Sibley, Ashton, Ritter, 30c; Sheldon, Hospers, 32c, and to Alton, Ia., 34c. (R.)

Kansas City Southern, Sup. 2 to I. C. C. No. 3000, April 30. Farm wagons, farm trucks and parts thereof, from Fort Smith, Ark., to Vinita, 16c; Tulsa, 22c; Durant, 39c; Bartlesville, 28c; Guthrie, 36c; Oklahoma City, 40c; Shawnee, 40c; to Nelagony, Okla., 32.5c (r-s) (also rates to other Oklahoma points).

Chicago, Milwaukee & St. Paul, Sup. 19 to I. C. C. No. B-2192, May 1. Wagons (not pleasure or passenger vehicles) and parts thereof, farm wagons and parts thereof, wagon seat springs, from Ottumwa, Ia., to Omaha and South Omaha, Neb., 17.22c.

F. A. Leland, agent for Atchison, Topeka & Sante Fe and others, Sup. 18 to I. C. C. No. 948, September 30 (S. P. 24035). Vehicle shafts in the rough from Pocahontas, Ark., to Springfield, Mo., 14½ (a), wagon wood in the rough, 15c, and wagon wood in the white, 18c, from Pocahontas, Ark., to Fayetteville, Ark., Joplin and Neosho, Mo. (a-s); wagon wood in the rough from Coombs and St. Paul, Ark., to Springfield, Webb City, Carthage, Joplin, Mo., and Galena, Kas., 13c. (A.)

Also I. C. C. No. 980, April 10. Wagon wood and bows from Ft. Smith, Ark., to Joplin, Mo., 13c; wagon wood in the white from Ft. Smith, Ark., to Kansas City, Mo., 19c; vehicle wood from Memphis, Tenn., to Springfield, Mo., 12½c.

Minneapolis & St. Louis I. C. C. No. B-82, April 1. Wagon boxes from Oskaloosa, Ia., to Indianapolis, Ind., 27.9c.

Hosmer, W. H., agent for Illinois Central, C. B. & Q., etc., I. C. C. No. A-398, May 1. Dump carts, farm wagons, to Algiers, Ia., Galveston, Tex., New Orleans, La., Mobile, Ala., Pensacola, Fla., and other gulf ports (for export), from points in Chicago and Milwaukee groups, 19c, and from Davenport, Ia., group, 27½c.

Also Sup. 5 to I. C. C. No. A-356, May 1. Wagons, skeins and boxes between Springfield, Mo., and Memphis, Tenn., and stations taking same rates, 22c.

Also Sup. 5 to I. C. C. No. A-356, May 1. Wagons, between Memphis, Tenn., and Pierce Junction, Kas., 32c; Whiting, Kas., 32c; Straight Creek, Kas., 33c.

Frank Anderson, agent for Illinois Central, L. & N., etc., Sup. 6 to I. C. C. No. 12, April 28. Wooden vehicle material, viz.: bows, carriage and wagon from Memphis, Tenn., to Cairo, Ill., Paducah, Ky., Thebes, Ill. (for beyond), 13c; St. Louis, Mo., East St. Louis, Belleville, Ill., Louisville, Ky., 15c; to Evansville, Ind., Henderson, Ky., 14c; Owensboro, Ky., 15c; Cincinnati, O., Covington, Lexington and Newport, Ky., 18c; to Chicago, Ill., 18c; Peoria, Ill., 19c; Springfield, Ill., 20c, and Milwaukee, Wis., 23c.

Southern Ry., I. C. C. No. A-5536, April 29. Farm wagons, taken apart and thoroughly K. D., from Chattanooga, Tenn., to Atchison, Kas., 43c; Council Bluffs, Ia., 45c; Kansas City, Mo., Leavonworth, Kas., 43c; Nebraska City, Omaha, Neb., 45c, and to St. Joseph, Mo., 43c; to South Omaha, Neb. (R.), 45c.

Also Sup. 8 to I. C. C. No. A-4855, April 26. Wooden billets, blocks, or strips, in the rough, rim strips, spokes and handles in the rough, or turned but not finished, straight C. L. or mixed with buggy and wagon rims, oak or hickory, in the white, buggy and wagon rims, oak or hickory in the white, from Julian and Pleasant Garden, N. C., to Washington, D. C., 18½c; wooden billets, blocks or strips in the rough, buggy or wagon rims, oak or hickory in the white, and handles in the rough or turned L. C. L., 26½c; rim strips and spokes, rough or turned but not finished L. C. L., 27c.

Southern Ry. I. C. C. No. A-5520, effective Alabama March 25, interstate April 24. Wooden hubs not further finished than turned, bored, mortised and primed from Jasper, Ala., to Anniston, Ala., C. L. 18c, L. C. L., 20c; Avondale, Birmingham, Ala., C. L. 10c, L. C. L., 15c; Boyles, C. L. 10c, L. C. L., 15c; Calera, Ala., C. L. 27c, L. C. L., 34c; Decatur, Ala., C. L. 19c, L. C. L., 29c; Ensley, Ala., C. L. 10c, L. C. L., 15c; Grasselli, Ala., C. L. 10c, L. C. L. 15c; Woodward, Ala., C. L. 10c, L. C. L. 15c. (Also rates to other Alabama, Georgia and Tennessee points.)

Canadian Northern, Sup. 12 to I. C. C. No. W-179, R. R. No. W-1111, April 1. Automobiles from Duluth, Minn., and St. Paul, Minn., to Brandon, 103.7c; Portage, la Prairie, 91.7c, and to Winnipeg, Man., 78.7c (applies only on traffic originating at Detroit, Mich. The rate from Detroit, Mich., to Duluth, St. Paul, Minneapolis and Minnesota Transfer, Minn., is 91.3c.) (R.)

Baltimore & Ohio I. C. C. No. 11376, April 19. Rough staves from Frederick, Md., to Lancaster, Pa., 10c per 100 lbs., staves from Sir Johns Runs, W. Va., to Harrisburg, Lewisburg, Norristown and Reading, Pa., $2.00 per net ton.

"THE AMERICAN INVASION"

The owner of an American built car in England has written to his trade journal on the matter of American cars, and what he writes will be read with interest, we think, by makers here:

I was rather amused at the somewhat extraordinary advertisement of Arrol-Johnston re American cars vs. the Arrol-Johnston.

If I had been an agent for American cars I am afraid I should have called it somewhat offensive.

As I am in no way connected with the motor trade I should like to give my views on the subject, as the driver of an American car.

I consider the motoring public are greatly indebted to the American "invasion," and for the following reasons. It has brought the pleasure and convenience of motoring within the reach of the family man of moderate means, which is in itself a great thing, but there is another adavntage.

The British manufacturers are beginning to realize that it is not everyone who can afford to pay £300 to £400 when he wants a car, and they are now beginnnig to produce something less expensive.

A difference of £100 between one car and another is of considerable importance to many who would otherwise join the ranks of motorists.

I refer more especially to cars with seating accommodation for four or five. A two-seater car is not of much use to a man with a family of perhaps three or four, and until the advent of the American car he had to choose between going without a car or paying a high price for one.

Now things are altering, and in a few years I believe the man of moderate means will have several British makes to choose from, five-seaters, and in the neighborhood of £200. At present he has only one or two, and that is why the Americans have gained ground. They were the first to supply cars at a moderate price, and so far they have retained their advantage.

I take it that the average Englishman would always prefer to buy a British car, but if there is not a suitable one within his means who can blame him if he goes in for an American production? It is quite a fallacious notion that because certain cars are cheap they are necessarily nasty. The family man is not exacting, and so long as his car runs well, is reliable, economical, and will stand knocking about he cares little about an ultra-silent engine, body finish, etc.

The car I drive has certainly done excellently on above points, and as to Arrol-Johnston's remarks regarding the "cheap motorist," no decent man would think of estimating another by the price he has paid for his car.

ANOTHER BOSTON TRUCK SHOW

A meeting of the Boston Commercial Motor Vehicle Association was held May 1, in Boston, and the matter of holding a truck show for 1914 was fully discussed. The almost unanimous opinion of those present and the expression of several who were unable to be present, was practically unanimous in favoring another truck show for 1914. It is the purpose to hold it March 17 and close March 21. By doing this it will overcome some of the difficulty in carrying the exhibition into another week, as has been the custom heretofore.

TO PREVENT VALVE CAPS STICKING

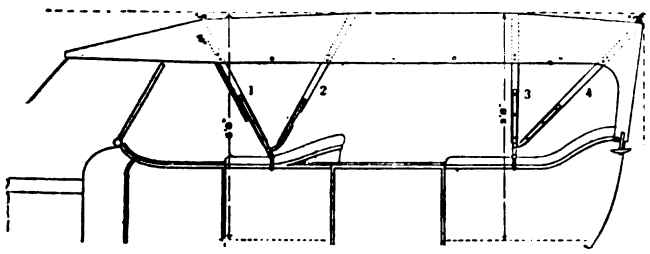
Mercurial ointment makes a fairly good substitute for the common mixture of graphite and oil for preventing valve caps from sticking when screwed down tightly. It has this disadvantage, however, it is poisonous, whereas graphite is not.

Trimming Shop

SETTING UP A HOOD

There are many ways of setting up a hood, according to The Australasian Coachbuilder and Wheelwright, but the following will look as well as, if not better than, the majority. The length of the car must be taken into consideration, to try and get everything in proportion, and to keep the lines of the car. Many a nice car is spoiled by the hood and vice versa. The craze at present is to get the hood as low as possible. That is easily attained if you are building the body, and can get the smith to put your goosenecks where you want them; but, unfortunately, we cannot all do that.

To make a start, set the finger irons on the goosenecks, and fit up No. 3 stick, holding in position with cramps. Set it 3 ft. 8 in. from top of seat; lower if you can, providing your gooseneck is far enough back; but the stick must drop at least two inches clear of back. Otherwise, the covering of the hood will lie on top of squab, and spoil shape of hood when down, and should you want to fit an envelope, you will find it awkward to make a nice job. The third stick must be your standard to work on. Then set No. 1 same height until you get No. 2. When you have done that, drop No. 1 one-half inch, and put straight edge on Nos. 2 and 3, and set up No. 4. Allow it to come over the back panel between two and three



inches; or, a good plan to follow is to set it in line with the bevel of the back panel, and drop it 1¼ in. from line of straight-edge, which will make a nice shaped hood.

To fit the extension or canopy, put a straight-edge along top of No. 1 and measure down the bow 10 in., and set to that. A good plan is to nail a light batten along the center of the bows, and from the back bow to seat, and leave in place till you have your webbing strained on, which do as tight as possible, using saddler's webbing. Line the sticks perfectly true, and, if made, you can put on your straps, placing them in the center of No. 1 bow underneath the webbing, and let them run through a staple on the extension. Set the extension square. Put a tack in end near the bend of the bow, and another in back bow, and stretch a piece of string from one to another along the side of the hood to get the line of the side square. Now measure from the beading underneath No. 1 bow, and from beading underneath No. 3 bow, and see if they are the same; if not, either raise or lower the tack at the back till they are so, as it all depends on the side line whether the hood is in keeping with the car. The hood must look square. Now do the other side, leaving the tacks as marks to go by when fitting side and back quarters.

Now get the Brewsters put on side and back. Measure two inches each side of goosenecks, and hood rest iron for your sides, and, for your back measure two inches from hood rest iron for first Brewster; then 3½ in. for second, and 3½ for third, same on other side; then divide the distance between each third Brewster by 3 to get the center one for back curtain. Then cover your bows with same material as you intend trimming hood, bringing it well around the bend of the bow, no specified distance; this must be left to the judgment of the trimmer.

To make back quarters, first measure one inch from center of third Brewster from hood rest iron. Mark with chalk, and square it with back bow. Same on other side, marking on back bow also. Now make a rough paper pattern to go by when cutting material, and at the same time measure for back curtain, as it all saves time. If you curve the quarters, you must sew another piece on the face side and then turn over to make a neat job. If your quarters are straight from where side quarter meets back quarter, reinforce with a piece of the stuff cut on the straight; otherwise your quarter will wrinkle, and nothing looks worse. Fit quarters neatly, and make second line to turn in by 1¼ in. from outside line. It is a good plan to have a straight-edge made on purpose that size. Then fit back curtain, alolwing outside to stand over one inch from center of Brewster for your line. Fit it square, and do not let any of the stitching on the back quarters show. In fitting celluloid mark bottom line 6½ in. from bottom of curtain; or, find the center each way, and fit exactly in the center, but usually 6½ in. from the bottom is suitable.

A word in cutting your material; say, the hood is 9 ft. 6 in. over all, and the twill or canvas 6 ft. wide. First cut off 9 ft. 6 in. from the roll, and from one side cut your two long webs. The balance left will do for the crown. If it is a narrow hood, you may be able to get your back webs also; if not, cut them across the roll. Now cut off another 9 ft. 6 in., and from one side cut off two pieces 19 in. wide for the side quarters. The other piece will cut back quarters, back curtain, and leave a piece to put the celluloid in by and, after you have sewn crown to side quarters, what you cut off will make binding for back and front.

In fitting side quarters and crown, strain tight, and fit without any wrinkles. Mark every few inches on crown and quarters with tailor's chalk. When sewing up be careful to get the marks exact. Also have marks on your back bows, so that you can fit it on again in exactly the same place. To get the line of your side quarters chalk a piece of string and snap from tack in extension and back bow, same as used in getting your lines when setting up the hood. In joining crown to side quarters, have join in center of webbing and sew up with two lines of stitching. Straps can either be fixed to a loop on the mudguard or on the chassis.

CARE OF THE TOP

The top is often looked upon as a bad weather friend and during the fine weather is reckoned more of a nuisance than an ornament, but needs care if length of service is wanted. It is difficult to remove dust from mohair with a brush if it has had time to embed itself, as it eats into the rubber through the somewhat large weaves of the hair. Cotton, having a finer weave, holds the dust superficially and lends itself to easier treatment with the brush. Gasoline should never be used for removing stains from a top or renewing the color; it eats the rubber away and causes the two layers of fabric to gape and become no longer waterproof.

The directions for caring for the top are, in the main, simple. Clean as often as possible of mud, road dust, and dirt accumulations of every sort, all of which are injurious to the leather, rubber or other fabric composing the top. In case these accumulations have taken hold of the surface of the top

so that a light dusting will not suffice to remove the matter, whip a bit of castile soap in some clean, tepid water to make a froth of suds, and wetting up a soft sponge in the water, go over the top until thoroughly cleaned.

Never let this dirt remain long upon the top. Such substances destroy the enamel of the leather or rubber and this gone it is a short shift to decay for the top. After sponging off the top always dry it off with a wash leather.

With leather and rubber tops upon which the enamel remains intact and vigorous, this bathing in water, smoothed out with a spray of castile soap as often as the top becomes foul, will prolong the wear of the fabric.

For the rubber top with a worn, broken and fractured enamel, showing a generally service-stricken surface, a dressing may be prepared as follows: Liquid asphaltum, one part; unrefined castor oil, three parts. Confine in a close vessel and agitate until a complete unity of the ingredients is secured. Should the dressing lack a sufficiency of black, add a bit of drop black cut with turpentine to a paint consistency. This will also do for the leather top. The castor oil renders the rubber or leather soft and flexible, and neutralizes the tendency of the asphaltum to become brittle.

A good formula for renovating a black rubber or leather top from which the enamel has largely disappeared consists of liquid asphaltum, ⅛ gallon; outside finishing varnish, ¼ gallon; boiled linseed oil, ⅛ gallon; castor oil, 1/16 gallon; coach japan, ⅛ gallon; ivory drop black, ¾ pound. Mix these ingredients thoroughly together in a closed vessel to permit active shaking. After agitating the contents sharply for a time, add refined or pure turpentine in a quantity sufficient to bring the mass to a good brushing consistency.

A formula including beeswax is made of asphaltum, liquid form, ⅛ galon; outside finishing varnish, ⅛ gallon; beeswax, 1 ounce; castor oil, ⅛ gallon. Bring to an intense black by the addition of a little drop black. Mix thoroughly and thin out to a brushing consistency with turpentine.

For a straight leather top with a worn and travel-stained appearance, but sustaining no fractures in its enamel, the following mixture will serve a good turn: Neatsfoot oil, ¼ gallon; beef suet, 3 ounces; melted beeswax, 1 tablespoonful. Melt the oil and suet together, after which add the beeswax. Confine in an air-tight vessel, agitating same until a complete mixture of the contents is secured. Apply sparingly with a soft cloth and follow up with a clean piece of woolen, wiping clean and dry.

All of the above dressings should be applied thinly and worked out smooth and uniform. With the exception of the last formula, all the materials should be brushed on, using for the work a flat bristle brush of soft joint and of a No. 1 quality.

For tops other than rubber or leather the use of tepid water and castile soap mixture is recommended, applied with a soft, sheep's wool sponge, wiped dry with a wash leather, and then given an application of some good transparent renovator to render the fabric soft and pliable and fortify it against the ravages of service.

The lining of the automobile top should also be cared for diligently. It needs frequent brushing with a whisk broom to enliven the nap of the goods.

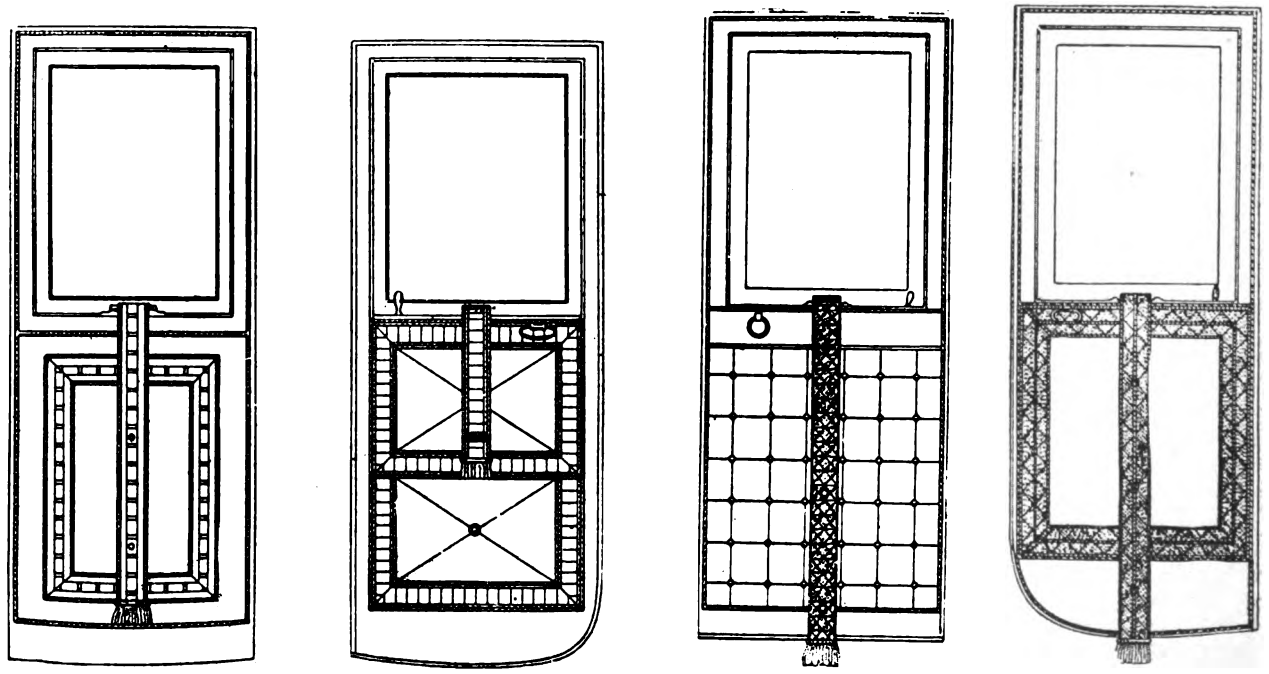
Present-day practice is to fit separators between the bows to prevent rubbing, but they cannot be large enough to prevent a certain amount, otherwise they would be unsightly. Straps are used to keep the bows from jumping as the car travels over inequalities on the road; these answer, in a fair degree. Something more rigid, though, in the shape of a metal clamp, is far better.

TRIMMING MATERIALS FOR A DOUBLE MOTOR HOOD

In forming an estimate it is handy to know exactly what is required for a job. Below will be found what is wanted for the average hood for a double car:

Twill or canvas covered bows, 9½ yards.
Webbing, 8 yards.
2 hood rests.
2 buckles, 1¼, for front straps.
2 buckles, ¾, for hood rest straps.
2 front straps, 2 hood rest straps.
3 rool-up straps for back curtain.
10 double Brewsters, 16 single Brewsters.
⅛ of a sheet celluloid.
3 knobs.
36 Brewster eyelets.
16 glove fasteners.
2 mudguard or chassis loops for straps.
2 staples, 1¼.
24 upholsterers nails, tacks, thread and gimp tacks.

There is a call issued for a meeting of dealers in automobiles to meet in Indianapolis, May 29, and form a national association.

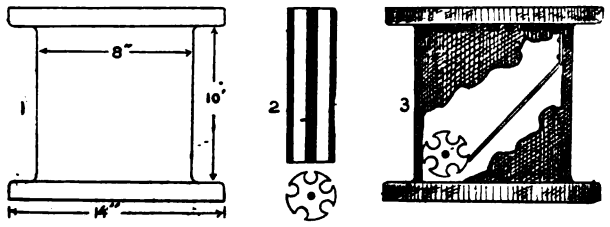


FOUR STYLES OF MOTOR CAR DOOR TRIMMING.

Smith Shop

HOME-MADE OXY-ACETYLENE OUTFIT

Welding is now so well, so quickly, and so much more perfectly done by the oxy-acetylene process that it is far and away the most desirable, but the cost of installing such a plant ranges from $200 to $1,000 according to capacity, and this makes it too much of a burden for a small shop. An ingenious smith who found his trade slipping away to other shops having such welding outfits, and not having the price, thought he would try something home-made. The result of his efforts resulted in a perfectly workable and simple and practical outfit that cost him to make, all told, $23.80. He describes how he went about it, and what material he used in an issue of The American Blacksmith, and makes his description plain with



FIGS. 1, 2 AND 3—SHOWING DIMENSIONS AND CONSTRUCTION OF THE CARBIDE HOPPER

cuts. Thinking we can render a service to those wanting such apparatus, we have given the description and illustration at length. He does the work with this cheap plant that is done by a competitor with an outfit costing $375.

The highest welding pressure needed is only 15 pounds. If there are no leaks the plant is as safe as a cook stove. He says:

I will first show how I made the acetylene generators. I secured an old range boiler that was perfectly tight and had no leaks. This boiler was the regular height, such as any plumber keeps in stock, and 24 inches in diameter. I then had a pattern made for a top which was 8 inches square and 12 inches high, with a round flange on each end. This pattern was made of 1-inch lumber. I then took this to the foundry and had a casting made as shown at Fig. 1. The square is 8x8x10 inches high and the flanges are 14 inches in diameter. I then made another pattern and had a casting made as in Fig. 2. This piece is nothing but a casting 3 inches in diameter and 8 inches long, with five slots the full length each 1 inch deep. I then took a piece of flat spring steel and put it in the square hopper, sloping down against the roller as at Fig. 3. The roller is held in place by a shaft in each end, ½ inch in diameter. This makes the carbide hopper. The carbide is placed on top of the spring steel; as the roller is revolved the slots get full of carbide, and as they pass the spring it scrapes it all off except that in the slot, which drops down through in the water, making the acetylene gas. When finished, the generator appears as at Fig. 4. A flange should be bolted on top, as shown, which can be removed to put in a new supply of carbide. In the illustration A represents the roller; B the steel plate; C the hopper and D the top of the boiler. This top has a hole 8 inches square cut in it where the hopper is bolted on. E represents a small safety valve; F a pressure gauge; G the boiler and H is a ½-inch hole with a short pipe screwed in at which to attach the hose. This makes the generator complete.

In making the generator, bolt the hopper on the top; using good rubber gaskets between joints to make them absolutely tight, so there will be no leaks.

To use: Fill the boiler half full of water and fill the hopper with carbide. Then bolt on the top and turn the roller past one notch. This allows a small quantity of the carbide to drop in the water generating the gas. Turn the roller gradually till the pressure gauge shows fifteen pounds; then by turning a notch occasionally you keep the pressure up.

The oxygen generator is made by taking a piece of 5-inch gas pipe 12 inches long, screwing a flange on each end and then bolting a plate on each end. This is then put on a small stand as in Fig. 5 and connected by a 1-inch pipe to the supply tank, which may be another range boiler like the acetylene generator.

The water in this tank should never come as high as the top of pipe at A. To make the oxygen, put one pound of black oxide of manganese and one pound of chlorate of potassium in the 5-inch pipe generator. See that the valve in the 1-inch pipe is open, then light the gasoline stove under the generator. The heat generates the oxygen and drives it over into the bottom of the tank. From there the gas rises up through the water to the top of the tank, leaving all the impurities in the water. When the desired pressure is secured turn the fire down. From 20 to 50 pounds oxygen pressure is required, according to the style of work. On my outfit I put an extension rod to the welding bench so I could regulate the fire. The generators should be about the same distance from the welding bench as an anvil is from the forge.

Now take two pieces of good ½-inch hose, 10 feet long. These are to carry the gases from the generators to the torches. The torches were the hardest to get. I wrote to a number of firms who manufactured welding outfits, but they all wanted to sell me generators ranging in price from $200 to $1,000. I finally found one firm who would sell me torches for $5, and that made by outfit complete. With this outfit I can weld steel, cast iron, aluminum, brass, copper, or can weld any two metals together. The gases are very cheap. I generally charge one-fourth the value of an article, and nothing less than 25 cents. For instance, I welded a piece of a stove, the work being worth about a dollar, and charged 25 cents; and for an aluminum crank case for an automobile engine costing $50 I charged $10, yet it took no more time or gas to do the job.

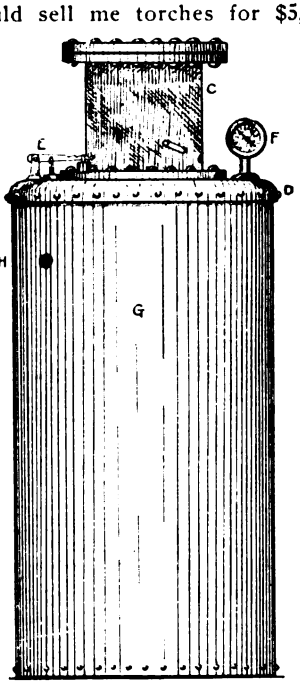


FIG. 4—THE ACETYLENE TANK AND GENERATOR COMPLETE

I used two old tanks which are as good as new if they don't leak.

My complete outfit appears as in Fig. 6.

I would suggest writing to the manufacturers of complete outfits, as their catalogues give a lot of information on doing all kinds of work. A good outfit can be made for les than $25, and you can get jobs as soon as people know what you can do that will more than pay you for your time and the outfit.

There are some practical points about the use of such an apparatus when in shape to work that will be good for the beginner to know, so we append herewith an account that will help out a lot in this direction. The writer says:

As to the chemicals used to manufacture the oxygen it will be best to buy them from some supply house for the local

druggist will ask a price that one cannot afford to pay. The chlorate of potassium comes in 100 pound kegs and costs from 12 to 14 cents, depending on the house you buy of. In some instances I have had the druggist ask me 50 cents per pound for this. The manganese dioxide is considerably cheaper, costing from 5 to 7 cents per pound. The oxygen is prepared by mixing one pound of the manganese of dioxide with seven pounds of the chlorate of potassium. After thoroughly mixing these two chemicals they should be placed in the generator and the cap screwed on secure. Next in order will be the mixture for purifying the oxygen as it is given off from the generator. This is brought about by passing it through a solu-

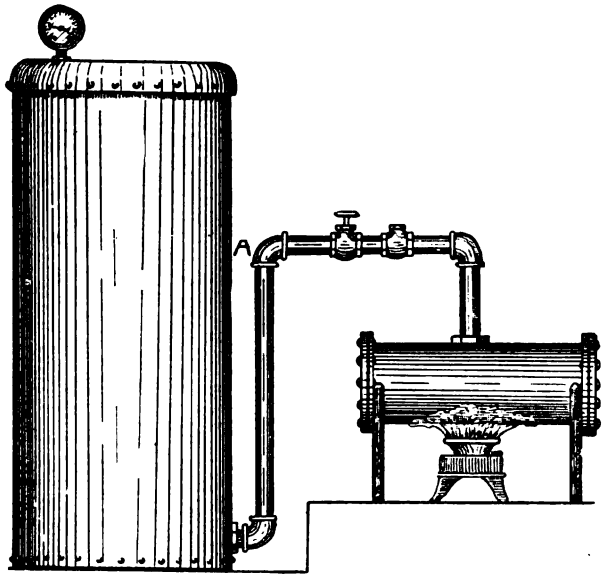


FIG. 5- THE OXYGEN GENERATOR AND TANK WITH A CUT-OFF VALVE AND ALSO A CHECK VALVE IN THE PIPE

tion of caustic soda and water which is placed in the small filter tank. One ounce of the caustic soda to one gallon of water (soft preferred) is sufficient to free the gas of the impurities that it contains as it is given off in the generator.

Next in order will be the torches under the generator, which should be started burning. As soon as the gas starts to generate it can be heard bubbling up through the water in the small tank. This will continue so long as the chemicals in the generator are giving off oxygen gas. When this ceases the torches should be turned out and the valve closed between the small tank and the storage tank and the gas is ready for use.

Seven pounds of the chlorate of potassium and one pound of the manganese dioxide will generate in a thirty-gallon boiler of about 100 pounds of the pure oxygen, and this amount of oxygen will do a great deal of welding after the operator has had a little experience, as in learning to operate the machine considerable gas is wasted in experiment that will be saved later on.

Before starting the welding torch a protection for the eyes should be considered, as the light is so intense that if some protection in the way of a colored glass be not used the practice would nearly destroy the eyesight, unless the operator had uncommon good eyes. A colored glass can be purchased from some stock house where the welding rods and chemicals are purchased. It will cost from $2 up, depending on the size of the glass and the way it is mounted. One should not start the welder, not even for a moment with the eyes unprotected. I have seen bystanders watch the welder for possibly not longer than a minute and when they turned to leave the building they could hardly find the door, especially if the room were a trifle dark.

The desire to light the torch for the first time should not result in slighting the making of the machine. I remember when making my welder I could hardly wait to assemble the last few parts to get the machine started. But there will be plenty of time to use the machine and all parts should be made the very best.

All in readiness, we will light the torch for the first time. In the first place, we should put on one of the smallest tips, one with a hole in it a little smaller than an ordinary lathing nail. Open the valve leading from the acetylene tank a trifle and light the flame. Gradually turn it on until the flame is burning about the capacity of the tip; that is, until the flame is just about ready to leave the tip. Now open the cock and let a quantity of oxygen into the torch. The flame at once begins to turn white as more oxygen is turned into the torch. Continue turning in the oxygen gas until the flame has come down to a small white tip about three-eighths of an inch in length. The tip should be just as long as possible without, however, having a tail to the little flame. If a little white tail is noticed on the flame it indicates not enough oxygen gas and the valve should be opened just enough to make a clean cut flame. In Fig. 6 we have the shape and size of five different sized tips. The larger ones are used for the heavier work. For welding little rods and very small castings tips 1 and 2 are used.

We are now ready for practical work and to begin with we will try something easy, a straight casting for instance, as shown in Fig. 7. The casting was broken as shown at B. The first thing to do with any casting is to get it in shape to weld, and a great deal of success depends on the operator, as different conditions will require different operations and preparations. All straight, as well as many irregular castings, should be ground from both sides near the fracture, leaving a V shape from both sides if possible as shown at A in Fig. 7. Now we are ready to apply the heat to the casting. Take a welding rod in one hand and the burning torch in the other, and turn the heat on from one place to the other along the fracture until the parts begin to melt, at the same time holding the welding rod near enough the flame to have it quite hot. Now dip the end of the welding rod into the borax and place it directly under the flame. It will at once melt and flow like liquid. Continue this across the face of the piece, being particular to leave the built up metal a little higher than the casting itself to allow for grinding down after welding.

We have now welded one side of the casting and are ready for the other. No time should be lost, for the cooler the casting gets the more gas it takes to bring it back to a welding heat. Turn the casting and weld the bottom side as the top was welded, building up a little higher to allow material to

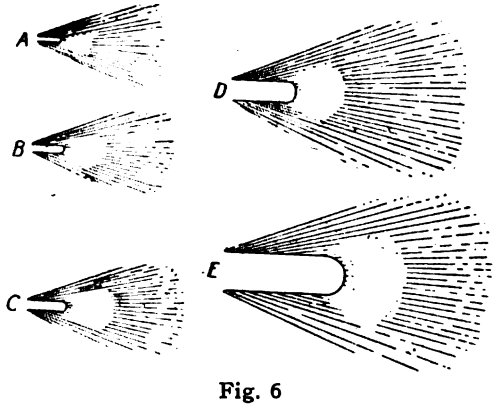


Fig. 6

grind off, making the surface flat and smooth as before. The corners should be well built out to allow squaring up in case they were square before. As soon as the part is welded it should cool gradually; never palce in water. Many times if the metal at the weld is too hard to file it may be softened by burning sulphur on it while hot. This hardness comes from not having the mixture of gas quite correct, or crowding the weld a little too fast.

The welding rods are made of a cast composition and may be purchased of a welding supply house. Rods for all kinds of work may be purchased in different sizes, 3/16 and ¼ inch

being the sizes most used for the small work. They melt easily and are easily handled. As they burn down too short to handle they should be placed in a box and the pieces welded together, or a small pair of tongs made to use up the pieces.

Our next weld, shown at B in Fig. 8, is a trifle different than the one just described, and in order to retain the same shape of the casting after welding as before, we will have to proceed a little differently. An experienced welder would have no trouble in welding this shaped piece without getting it out of shape, but the beginner must not spoil a job, thus hurting his business at the outset, therefore in this case we will place the casting in its shape with the fracture placed close together and build under it with molding sand to hold it in shape. The

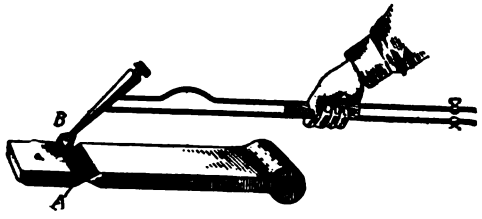


Fig. 7

molding sand is shown at A in Fig. 8. Now that we have the correct impression in the sand we will carefully lift the broken parts from the sand and grind the V notch in the fracture, as shown in Fig. 7, at B. In this case if the casting is not heavy it is best to grind the V all from the top side. After the V notch is ground it is not a bad idea to remove a bit of sand directly under the fracture, allowing the metal to pass entirely through and leaving a little metal to grind away, making both sides perfectly smooth.

A great many of the smaller castings may be held in a vise while the weld is being made, while the smaller pieces may be held in position with a small hand vise. The getting the various parts in shape and holding them cannot be described or treated in print in a lifetime, as every day something new will come up different than has come to the shop before, and for this reason the operator must have ability to figure out the best method of doing the job.

In case the casting is broken in a number of pieces it will be necessary to place the pieces together and hold them in shape with molding sand, but whatever the method of holding, the V notch must not be overlooked, as a weld that does not go entirely through will amount to but very little, as the metal

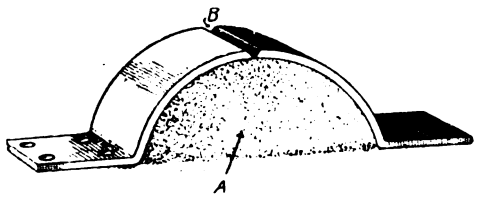


Fig. 8

will not flow through a fracture like common spelter in brazing. Flat small pieces may be placed on an asbestos board while the weld is made, and the small irregular ones can be placed on molding sand placed in a box and kept in shape for the purpose.

If the casting is in such place that it can be heated in the forge before welding it will save a great deal of gas, besides making the job easier, and can be left in the ashes to cool gradually. After making a weld always paint the job up in nice shape as it pleases the customer.

In Fig. 9 we have something entirely different than the other just mentioned and it will be treated a little differently. We have a small gear with a number of teeth broken out. This may at first look a little difficult, but will be just as simple as the welds just described. In the first place we will get the box of molding sand and bury the wheel all but the extreme top where the teeth are broken out, as shown in Fig. 9 at A, only leaving the sand project above the height of the teeth, and wider than the thickness of the wheel. Now with a larger tip than used on the smaller jobs this place should be welded full, leaving metal enough above the surface to allow of grinding down to correspond with the balance of the teeth.

The sides should be first ground down to the correct thickness and we are then ready to cut the teeth in the wheel. Of

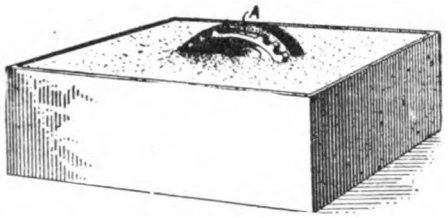


Fig. 9

course, if a gear cutter or a miller is at hand this will be an easy job, but if it is to be cut by hand it will be a trifle tedious, although it can be accomplished if pains are taken to get the teeth exact. In welding spokes in small, or even large wheels, the entire wheel must be heated good and hot; that is, hot enough to "sizz" when water is dropped onto it. If it is not heated it will crack at some point about the wheel, owing to the uneven expansion and contraction.

CREDITORS BUY COLUMBUS BUGGY CO. PROPERTY

Creditors of the Columbus Buggy Company purchased the property of the company May 14 at the court sale, for $310,000. This was approximately two-thirds of the appraised valuation of the plant and business. Twenty days is allowed the court in which to confirm or reject the sale. If the sale is confirmed it is understood that the plans submitted to creditors a short time ago by the creditors' committee, composed of George W. Bright, E. R. Sharp, D. N. Postlewaite. B. G. Watson, George W. Lattimer and T. C. Dunlap, will be carried out.

Under these plans the creditors' committee proposed to operate the business until it could be disposed of to advantage. In this relation it is understood to be the desire of the creditors to retain Receiver Daniel McLaren as general manager of the business. Gasoline and horse-drawn vehicles already contracted by the company, or for the manufacture of which there may be a quantity of material on hand, will be completed and sold as soon as possible. The committee then proposes to turn its attention to the manufacture of electric automobiles so as to have them ready in advance of the regular fall market. This branch of the business has shown a large profit in the last seevral years and is believed by manufacturing authorities to have large possibilities.

Payment of the expenses of receivership and those creditors who have not entered into the agreement with the committee for the purchase of the property, it is said, can be paid out of the cash in the hands of the receiver and proceeds of the quick assets already liquidated or soon to be converted into money. It is believed that sufficient capital may be obtained for financing the operation of the creditors' organization, either from the creditors themselves or by means of loans from local banks. It is thought by the members of the committee that by the time the business is successfully in operation again under the new management proposed a reorganization or sale may be effected which will result in a far larger return to the creditors than otherwise would be possible.

BIG AUTO BUSSES

J. M. Karwisch Wagon Works, Atlanta, Ga., are building two double-deck busses for use at Grove Park Inn, Asheville, N. C. They will seat 35. They are 21 feet long.

125,000 CARRIAGES AND WAGONS MADE YEARLY IN ST. LOUIS

The advent of the automobile has not affected the horse-drawn vehicle business and 125,000 carriages and wagons are manufactured in St. Louis yearly, says P. E. Ebrenz, president of the Implement, Vehicle and Hardware Association of St. Louis.

"St. Louis ranks first among the carriage manufacturing cities of the country," said Ebrenz. "Although the number of carriages manufactured yearly has increased rapidly factories here are behind in the orders. Orders come to St. Louis not only from adjacent territory, but European shipments are heavy."

William H. Roninger has been appointed chairman of a committee to superintend the arrangements for the C. B. N. A. convention.

TIRE TUBE AND SUNDRY PLANT

The Morgan & Marshall Co-operative Tire & Rubber Co., which recently was incorporated under the laws of Ohio with an authorized capital of $500,000, is planning to erect a plant in East Liverpool in that state. It will be devoted almost wholly to the production of tires, tubes and sundries. The organizers and incorporators of the company are R. J. and I. M. P. Marshall and Howell Morgan.

PACKARD MOTOR TEST

Late reports from the testing laboratory of the Automobile Club of America, where the Packard "38" engine has been undergoing a non-stop test, were to the effect that the motor was still running as smoothly as ever, and that there was every indication that the 300-hour mark will be passed.

Interest has been aroused by this test, as it has given automobile men their first chance to compare the working of an American built poppet valve type engine with the working of foreign built sleeve valve engine, under similar working conditions.

The Packard motor has broken the former record held in England of 132 hours. Never before has an automobile engine been subjected to so severe a test under official observance. The motor was placed upon the test May 3 at 10:43 p. m., and ran continuously with the throttle wired wide open, and the magnets wired so that the spark is fully advanced.

FORTY PER CENT. INCREASE CLAIMED

Automobile manufacturers predict that this year's business will show an increase of more than 40 per cent. over that of 1912. Makers of standard cars generally state that sales have opened up bigger than ever before and that in several instances the entire output of 1913 models will be exhausted within a short time.

An accurate and detailed report compiled by the Chalmers Motor Co. shows business to be unusually good. The increase set forth in this report is not confined to certain sections, sales being uniformly large all over the country. Even in Ohio and Nebraska, where floods and tornadoes have handicapped business heavily, the report shows sales to be running far ahead of last year's.

PLANT BIG ENOUGH AT PRESENT

The Hale Buggy Co., at Anniston, Ala., wish it known that the magnificent business they are now enjoying and the bright outlook make it necessary to prepare to take care of a largely increased business, and it is now completing arrangements to increase capital stock from $40,000 to $75,000. The company does not expect to erect additional buildings at present, as the present ones are most conveniently laid out and stand as one of the best buggy factories in the south, and can take care of considerably more business than a good many other factories can do in the same space. The company is running eleven hours per day at present, with a large force, and orders piling in, and if things continue this way it may be forced to have additional room.

THE PROPOSED NEW ZEALAND CONFERENCE

New Zealand coach builders are to have a conference at Wellington, opening on March 25. The idea is to form a national association for the promotion of the interests of the coach trade throughout the Dominion.

The conference, we are assured, will have the hearty good wishes of Australian coach builders for a full realization of the aims of its conveners. Much good has been accomplished by national associations of the character proposed in other countries. They bring the leaders of a trade together, crystalize floating thoughts, give those concerned an effective voice in national affairs, and do much to remove antipathies and encourage sociability and good will amongst men who as competitors are more than a little apt to misunderstand each other.—Australian Coachbuilder.

MOTOR VEHICLE TRADE ABROAD

The Department of Commerce and Labor, Bureau of Foreign and Domestic Commerce, has, under the skilled direction of Chief A. H. Baldwin, arranged in booklet form a very complete group of consular reports of the state of the motor vehicle trade in all foreign lands.

This inquiry was prosecuted at the suggestion of The Hub, and it has been more than a year developing. The results, so far, are very interesting, and we recommend all vehicle builders to procure a copy, as the information is as important as interesting. We have from time to time published the reports as they came to hand, but not as complete as they can be had in the Department's booklet.

WAGONS AND GAS ENGINES CLASSED WITH IMPLEMENTS

In the classification of exhibits at the Panama-Pacific exposition, to be held in San Francisco in 1915, farm wagons, farm carts and farm trucks have been placed in the section where agricultural implements and other farm equipment will be exhibited. Heretofore wagons, carts and trucks exhibited at large expositions have been arbitrarily placed in the transportation section. The action of the Panama-Pacific authorities in grouping these lines with implements shows they are familiar with the position they hold in the trade. This action undoubtedly will meet with the warm approval of manufacturers and dealers.

AUCKLAND EXHIBITION

Preparations are advancing for the forthcoming Auckland (Australia) Exhibition. The British Motor Car Manufacturers' Association has expressed its intention to make a big showing of the most modern features of the car trade. As intending American exhibitors have also decided to send across the Pacific the best they have in the way of motor cars, there is promise of an unprecedented motor car display.

NEW QUARTERS

The Merchants' Association of New York has moved into its new headquarters in the Woolworth Building, 233 Broadway, its old quarters at 54-60 Lafayette street having been outgrown. The new headquarters occupy the greater part of the ninth floor of the Woolworth Building.

Trade News From Near and Far

BUSINESS CHANGES

A. B. Harper has purchased the business of C. O. Johnson, in Havelock, Neb.

H. M. Rauscher has disposed of his business in New London, Ia., to Walter Skipton.

Hungerford & Glenn have purchased the Enterprise Carriage Works in Ottawa, Kas.

C. A. Henry has sold out his stock of vehicles and implements in Langdon, Kas.

J. A. Radford has purchased the business of O. B. Benson & Co., at Hildreth, Neb.

A. J. Roe has purchased the stock of vehicles, etc., of W. H. Green, in Creighton, Neb.

Ivan E. Crabb has purchased the vehicle business of Joseph Bielman, in Savannah, Mo.

J. A. Eastman has succeeded to the entire business of Tager & Eastman, in Mabel, Minn.

Carl F. Norton has succeeded to the entire business of Houck & Norton, in Bowman, N. D.

Steven Schultz has sold out his stock of vehicles, etc., in Prosser, Neb., to C. M. Berg.

George Knipple has purchased the wagon business of Wm. Rosborough, in Seward, Neb.

Chas. A. Wickstrom has succeeded to the business of Marsh & Wickstrom, in Lisbon, N. D.

Dries & Krogman have purchased the stock of vehicles, etc., of Yappen & Son, in Ashton, Ia.

Sid H. Brown has purchased the stock of vehicles, etc., of T. J. Tingle, in McKinney, Tex.

J. F. English has purchased the stock of carriages, etc., of H. J. Bruenig, in Humphrey, Neb.

Davis & Grieves have purchased the stock of vehicles, etc., of W. R. Goodrich, in Spencer, Ia.

Foster & Son have succeeded M. O. Foster in the vehicle and implement business, in Alex, Okla.

Steinhilber Bros., implements and vehicles, Pocahontas, Ia., have been succeeded by Battershell Bros.

Carl Jacobson has taken over the implement and vehicle business of the Dayton (Ia.) Hardware Co.

F. W. Morse has succeeded Edwards & Morse in the vehicle and implement business in LaMoure, N. D.

Wm. Sumpton, dealer in implements and vehicles, at Schuyler, Neb., has been succeeded by Tully Bros.

Bray & McClure have succeeded Oliver Bray in the vehicle and implement business in Maysville, Mo.

Stuntebeck & Breuer have been succeeded in the vehicle business in Bluffton, Minn., by Joseph Ahles.

George Collins has disposed of his vehicle and implement business in Atkinson, Neb., to Harry Focken.

Cleo Arnold has succeeded Arnold & Houston in the carriage and implement business in Coldwater, Mich.

G. B. Kine has purchased the stock of vehicles and implements of Hawley Bros., in McPherson, Kas.

E. G. Ballard has purchased the vehicle and automobile business of F. L. Hodgson, in Stewartville, Minn.

H. F. Brashears has succeeded to the entire business of Floyd & Brashears, in Mountain Park, Okla.

Charles Jensen has purchased the stock of buggies and implements of H. G. Harrison, in Graettinger, Ia.

Melgaard & Myron have succeeded to the vehicle and implement business of C. A. Melgaard, in Volin, S. D.

Runck & Co. have been succeeded in the carriage and implement business in Kathryn, N. D., by Albert Johnson.

L. L. Bassett has succeeded to the vehicle and hardware business of Bassett & McKissick, in Washtucna, Wash.

The George W. Davis Carriage Co., of Richmond, Ind., has changed its name to the George W. Davis Motor Car Co.

S. B. Christian and O. W. Long have bought the implement and vehicle business of T. R. Burns Hardware Co., at Craig, Mo.

James Molgard, of West Point, Neb., has purchased the stock of vehicles, etc., of Hutchinson & Mickelson, in Ruskin, Neb.

Christian & Long have purchased the vehicle department of the T. R. Burns Hardware Co., in Craig, Mo., and will add automobiles.

D. A. Brown & Son have sold a half interest in their carriage and implement business at Ashtabula, O., to Lynn M. Rockwell. The firm will be known hereafter as Brown & Rockwell.

NEW FIRMS AND INCORPORATIONS

Ed. Lervig has opened a new stock of buggies, etc., in Elwood, Neb.

A. A. Zemke has opened a new stock of buggies, etc., in Janesville, Ia.

Wm. Hanning is opening a new stock of vehicles, etc., in Oreston, Minn.

W. T. Brim has added a line of vehicles to his business in Green Ridge, Mo.

The Marshalltown (Ia.) Buggy Co. has opened a vehicle store in Clinton, Ia.

J. W. Fox & Son have opened a new stock of vehicles, etc., in Davenport, Wash.

Munger & Jordan have just opened a new stock of buggies, etc., in Homer, Neb.

W. T. Gregory has opened a new line of vehicles, etc., in Baxter Springs, Kas.

J. N. Benson has opened up a new stock of vehicles in Browns Valley, Minn.

The Texas Implement & Carriage Co. has opened for business in Itasca, Texas.

A. A. Zemple has opened a new stock of buggies and implements in Janesville, Ia.

Hammerand Bros., hardware dealers of Portsmouth, Ia., have added a line of buggies.

Martin Nelson has engaged in the buggy and implement business in Bixby, Minn.

Fred Jelinek has added a stock of vehicles to his hardware business in Valparaiso, Neb.

Wm. Brady, of Moquoketa, Ia., is about to open a stock of buggies, etc., in Preston, Ia.

DeCou & Hilborn have just engaged in the carriage and implement business in Persia, Ia.

Andrew Olson, of Osseo, Minn., has just engaged in the buggy and implement business.

McCloskey & Smith have just opened a new stock of buggies and implements in Stafford, Kas.

George Pullman is about to engage in the vehicle and implement business in Wellsville, Kas.

Bert Hawn has just established himself in the buggy and implement business in Russell, N. D.

A new carriage and wagon repair shop has been opened by Randall W. Walker, at Norwich, N. Y.

Sewell & Carter, of Burlington Junction, have opened a stock of carriages and automobiles in Maryville, Mo.

The Carter Auto Co. has opened a store in Spokane, Wash., at 1024 First avenue, with J. H. Prescott as manager.

The H. Nash Wagon Co., capital $50,000, has been incorporated at Boston, Mass., by C. E. Folsom, of Dorchester.

The Dallas Vehicle Works has incorporated in Dallas, Tex., with a capital stock of $6,200, by J. G. Schaffer and others.

The Dallas (Tex.) Vehicle Works has been incorporated with a capital of $6,200, by J. G. Shaffer, R. M. Irvin, W. O. Irvin.

The Texas Carriage and Top Co., Houston, capital $10,000, has been incorporated by John R. Patton, Charles E. Garber, S. W. Turney.

Murray & Sandford, who recently purchased the business of the Farmers Mercantile Co., in Manitou, Okla., are adding a line of vehicles.

The Maxwell, Newcastle Mfg. Co., to manufacture vehicles at Newcastle, Ind., has been incorporated with a capital of $50,000, by James W. Wellington, R. L. Wilson, H. A. Wilder.

Hazen Dump Wagon Co., Manhattan, manufacturers of wagons and autos; capital, $100,000; directors, Henry L. Hazen, Fort Lee, N. J.; Frederick W. Dan, Lancaster, and Arthur J. Carlton, Edgewater-on-Hudson, N. J.

Articles of incorporation have been filed with the secretary of state for the Eureka Wagon Co., with nominal headquarters at Pierre, S. D., but to do business in Chicago. It is capitalized at $100,000, and the incorporators are Willis H. Thompson, 5702 Indiana avenue; E. C. Frost, 240 West Twenty-second street; P. J. McAndrews, 17 North LaSalle street, Chicago, and J. W. Laughlin, Pierre, S. D., who is the South Dakota representative of the company for legal service.

NEWS OF THE AUTO TRADE

The Cole plant in Indianapolis is to be increased by a $150,000 building.

West Motor Car Co., Topeka, Kas., is reported incorporated for $10,000.

Fedders Mfg. Co., Buffalo, N. Y., is said to have incorporated for $400,000.

Pressed Steel Motor Car Co. is reported incorporated at Cleveland, O.

Cincinnati Alco Motor Car & Truck Co. is said to be incorporated for $25,000.

K. & C. Wheel Co., Chicago, has incorporated for $10,000, to make automobile accessories.

Allen Motor Co., Fostoria, O., is about incorporating, with E. W. Allen, W. O. Allen, W. O. Wright named.

The King City Motor Sales Co. has been incorporated in Kansas City, Mo., with a capital stock of $10,000.

Hall & Taylor, Trenton, N. J., is said to be incorporated for $25,000, with W. H. Taylor, H. A. Hall and others.

Salt Lake City reports that an organization is planned to construct a million dollar plant for an automobile factory.

Canham Auto Co., Whappeton, N. D., is incorporated with $25,000, and R. Canham, L. Canham and others in interest.

Schaffer Motor Co., Sedalia, Mo., with $35,000, and F. K. Schaffer, J. H. Remington, C. S. Gray among incorporators.

Wahl Motor Co., of Wilmington, Del., is published as incorporating for $500,000. J. E. and A. J. Hofweber are mentioned.

Still's Automobile and Accessories Co., with $10,000, is credited to New York. G. E. and J. H. Still are among promoters.

The Four Wheel Drive Automobile Co., of Clintonville, Wis., is about to build two additional factory buildings and a power house.

Michigan Motor Car Co. is reported incorporated at Memphis, Tenn., with $5,000. C. V. York and Irby Bennett are named.

Bellaire (O.) Automobile Co. is incorporated for $6,500. J. F. Johnson, G. D. Spragg, J. H. Greenlee and W. H. Morris are named.

The Baker Motor Vehicle Co. is reported, but not verified, as incorporated for $1,250,000 as an Ohio corporation. City not stated.

Costello Seat Co., Chicago, is reported to be incorporated for $10,000, with G. W. Costello, D. J. Hennessy and W. R. Swissler named.

White Sales Co., Jacksonville, Fla., is incorporated for $100,000, to engage in the business. J. R. Collins, N. A. Collins and others are named.

The Paige-Detroit Motor Car Co. will erect a large new plant on McKinstry street, between Fort street and the Wabash and Pere Marquette tracks, Detroit, Mich.

Report not verified is to the effect that the H. H. H. Tire & Mfg. Co. is incorporated for $50,000. New York City is given as headquarters. J. J. Coyl is named.

It is reported that the Dixie Motor Co., of Asheville, N. C., with authorized capital of $50,000, is planned. J. C. Abogast, Ralph C. Abogast, J. E. Craddock are named.

Fisher Automobile Co., Indianapolis, is incorporated to deal in autos and accessories. $25,000 is stated. C. G. Froher, F. E. Hunter and H. L. Hammond are named.

Articles of incorporation have been filed for the F. P. Motor Wagon Co., at Pierre, S. D., with a Chicago office and a capital of $250,000. Incorporators are Thomas F. Graham, Edward E. Slade, William G. Price, R. J. Reynolds, Chicago; L. I. Stephens, Pierre.

At a meeting of the stockholders of the Duplex Power Car Co., Charlotte, Mich., the following officers were elected: President, Frank P. Town; secretary, M. J. Lamson; treasurer, James H. Brown; directors, Frank P. Town, Frank L. King, James H. Brown, George A. Williams, H. H. Bryan and M. J. Lamson. The indications are that the factory will be reopened at once and the manufacture of the truck pushed. The company has about $20,000 worth of cars nearly completed, and these will be finished and placed on the market.

IMPROVEMENTS AND EXTENSIONS

A new addition is being erected to the DeKalb (Ill.) Wagon Co.'s plant.

An addition of 150 x 80 feet is being made to the Hopkins Wagon Works, at Hanover, Pa.

Allen Strait, Umatilla, Fla., has just completed a new wagon and blacksmith shop, 60 x 80 feet.

Ira Hinnershitz, proprietor of the Bowmansville (Pa.) Coach Works, recently installed a lot of new machinery.

John Yaissle, carriage and wagon builder at Pottsville, Pa., has moved his plant into new and larger quarters.

C. F. Stroberg & Son, Macon, Ga., have been forced to leave their old quarters on account of the great increase in their business and after July 1 will occupy a big building now used as a warehouse.

The St. Bernard Wagon Co. has moved into new quarters. The building, which was specially constructed for it, is a handsome three-story brick, equipped throughout with the latest machinery, such as drills, planer, band-saw, wood-worker, electric forge, blowers, etc. On the first floor is located the planer and lumber storage; the second floor is filled with machinery of various kinds and forges, with paint and dry room in rear. On the third floor is a five-room apartment for use of foreman. The new factory has thousands of feet of floor space, but this has already been found too limited and contract has been let for an addition.

The Thos. R. O'Brien wagon plant at Springfield, Mass., has been moved into a new building just completed for it. It is of mill construction of uncommonly good quality. The building is 43.8 x 90 feet, with an ell 38 x 40 for use as a blacksmith shop. In the rear is a lot 30 x 40 paved with concrete. The first floor is used for the woodworking shop, the second as a repository, and the third as a paint shop, and a four-ton elevator, designed for lifting automobiles, connects the floors. Mr. O'Brien has installed a complete equipment of motor-driven woodworking machinery and his facilities are greatly increased. The old shop will be kept for storage.

FIRES

John Haughan, of Earlton, Kas., has sustained a fire loss of about $8,000.

The Oliver Motor Truck Co., of Detroit, Mich., has sustained a fire loss of $16,000.

The stock of vehicles of Becker & Johnson, in Marietta, Wis., has been destroyed by fire.

John L. Brooks Co., wagon makers, Baltimore, Md., suffered slight loss from fire April 13.

The West Jersey Wagon Works, Camden, N. J., sustained a $3,000 fire loss on April 24. Fully insured.

The plant of the Baltimore (Md.) Hub & Wheel Mfg. Co. was destroyed by fire May 11. Loss, $75,000.

The plant of the Oxford Buggy Co., in Oxford, N. C., has been damaged by fire to the extent of $25,000.

The spoke mill of the Mitchell Wheel Co., at Hohenwald, Tenn., was destroyed by fire May 4. Loss, $5,000.

The carriage and wagon factory of W. C. Laderer & Co., Evans City, Pa., was destroyed by fire April 25, with $35,000 loss.

The F. E. Snow carriage factory at Lawrence, Mass., was destroyed by fire May 10. The building was filled with carriages. Loss, $20,000.

The Guthrie (Ky.) Warehouse Co. building, occupied by Evans & Son, carriage manufacturers, was destroyed by fire April 7. Loss, $15,000.

The A. A. Cooper Wagon & Buggy Co., at Dubuque, Ia., was destroyed by fire. Loss to stock and machinery, $66,085, with only $20,150 insurance.

Fire completely destroyed the Hillsdale (Mich.) Truck & Wagon Co.'s plant on May 7. The plant had been idle many months, but contained a quantity of lumber and machinery. Loss, $4,000.

The Staver Carriage Co.'s plant at 1725 Michigan avenue, Chicago, sustained a fire loss on May 15. Six automobiles were burned and property valued at $25,000 was destroyed by the fire on the second floor, and did considerable damage to the offices and salesrooms on the first floor.

HEADLINE THRILLERS

The American Economist is "devoted to the protection of American labor and industries." At present it is much perturbed, of course, so it is harrowing to read its headlines. They are a cubist picture of destruction. Listen:

Now for the Stormy Senate Sea.
Wiping Out an Industry.
It Will Amount to a Double Tax.
Prof. Wilson's Free Wool Crime.
For the Benefit of Foreigners.
Sowing Dragon's Teeth.
Tinker, Tinker, Tinker.
The Vote That Is Yet to Come.
Give Them Rope Enough.
Illogical and Futile.
Will Hurt the Motor Car Industry.
Inconsistency of Underwood Bill.
Democratic Tariff Expectations.
Injurious Effect of Free Sugar.
Bryan in the Saddle.
Sure to Be a Free Trade Measure.
Republicans Should Claim Everything.
Cotton Men to Draft New Tariff.
The Tariff Will Not Cut Prices.
Another Very Costly Lesson.

SOME GUARANTEE

An Ohio motor car maker warrants in this fashion. It is the most sweeping we have seen:

"Know all men by these presents, that a corporation organized under the laws of the state of Ohio, does hereby warrant against defective workmanship and material during the life of said car. Provided, however that said car remains the property of the original purchaser in whose name this warranty is issued, otherwise the liability of this particular car, as covered by this warranty shall terminate within one year from date hereof. The terms of this agreement are such that all parts shall be returned to the main office, charges prepaid, for examination and if found defective will be replaced at its factory without charge. This warranty does not cover consequential damages of any kind nor apply to defects from misuse, neglect, redesigning and reconstruction of said motor car, nor to tires, rims or accessories which are guaranteed by their respective makers."

KNIGHT PATENTS DO NOT COVER ALL SLEEVE VALVES

Holding that "for practical purposes" the engine covered by the original Knight British patent, issued in 1905 and numbered 14,729, "is an insignificant toy," the Master of the Rolls and Lords Justices Buckely and Hamilton have upheld the decision rendered last August by Justice Neville in the British Chancery Courts to the effect that the Argyll engine does not infringe the Knight patents; the case was up on appeal. That the engine described in that patent really is of little significance, Justice Hamilton pointed out, is indicated by the fact "that Knight's latest patent, which has attained practical success, has done so by introducing another sliding port, a second sleeve, which makes it possible to abandon altogether the arrangement of the ports adopted in 1905; and that it is not covered by a "master" patent as the plaintiffs sought to prove he made very plain by interestingly defining both the legal and "practical" meaning of a "master" patent.

BLOCK SYSTEM OF DISTRIBUTING GOODS

The high cost of distributing merchandise to the consumer is one of the foremost questions of the day. It has especially been mentioned that in the daily delivery of milk, bread, etc., many supply wagons pass over the same street, each serving only a few of the residents. This adds greatly to the cost of the articles. Out in Sydney, Australia, one of the plans presented to the Parliamentary Food Commission is for the block system of bread delivery. A calculation made by the chairman showed that, taking the government statistician's figures, two loaves per head were consumed by Sydney's population of 670,000. On this basis the block system of delivery would save $70,000 per week, or 6 cents per family, while the baker's profit would remain the same.

"THE SCARLET EMPIRE"

D. M. Parry is running his great novel stunt, "The Scarlet Empire," in American Industries serially.

The scene is laid in the lost continent of Atlantis, and it will afford the author a chance to develop his ideas about business, labor, and social democracy in an alegorical fashion. It exploits state socialism from Mr. Parry's point of view. It is necessarily a work of virile fancy as to place, and we have no doubt the author will make the pages as full of interest as he is conversationally when on the subject of his theories.

FOREIGN NOTE

Many of the members of the Badsworth and Grove Hunts who attended the Badsworth Point to Point had great difficulty in getting away. Owing to a heavy downpour of rain the ground became a quagmire and the very unusual sight of quite a hundred high-powered cars bogged was seen. Photo shows how the cars of high horsepower were helped out by horses from an adjoining farm.

OBITUARY

THE PASSING OF MR. KENT

When S. W. Kent went to join his old and true friend, C. B. Sherron, two choice spirits met.

Mr. S. W. Kent was such a well known figure in the carriage trade, and due to his constant traveling over wide expanses, his acquaintance was notably large.

He was the most genial of men, with the shrewdness of the typical Yankee and the breadth and generosity of the westerner.

He died in Cazenovia, N. Y., where he had made a permanent settlement, and had embarked in business with one of his sons, of whom he possessed six. His widow and hosts of friends survive to keep green his memory.

JAMES W. STURTEVANT

James W. Sturtevant, late vice-president and secretary of The Sturtevant-Larrabee Co., of Binghamton, N. Y., passed away April 20. The deceased was widely known and liked by a large circle of trade acquaintances, as his company, in its long career has built up a country-wide reputation for sleighs and buggies. So far as we are informed by the brief notice, there will be no especial change in the affairs of the corporation. We extend to his business associates our sympathy.

DEATH OF PIONEER WAGON MAKER

Israel Sampson, 87, pioneer wagon maker, died May 2, at the home of his brother, Daniel Sampson, of Houcktown, O. He had been gradually declining in health for some time. Two sons survive. Mr. Sampson operated a wagon shop at Houcktown for many years.

HISTORY REPEATS

How interesting it is, in reading accounts of the early experimental work done in connection with road carriages, to find many of the ideas—of course, in a crude form—which obtain today foreshadowed there. In reading an account of the "steam drag" which was built in the early '30's of the last century by Heaton Bros., of Birmingham, I read that they employed a reducing gear between the engine and the road wheels, which, in principle, differed little, if anything, from the Panhard gear of today, or, rather, from that gear in its earlier forms.

And it is further of interest to note, writes Henry Sturmey, in Motor, that in this same carriage the difficulty of having no differential, and yet allowing for the different road speeds of the driving wheels when taking curves, was met in precisely the same manner that many tricycle makers at one time adopted for the same purpose. This system has also been embodied, though with no great success, in motor cars, the method adopted being that of employing ratchet clutches. The description goes on to say that "the hind wheels of Heaton's carriage are loose upon the axle tree, but furnished with ratchet teeth, which may be acted on by corresponding catches fixed on the ends of the axle, so that either wheel is allowed to advance farther than the other in turning a corner." And it is recorded that in August, 1833, this vehicle successfully ascended Lecky Hill, near Birmingham, on the Worcester road. This hill has a grade of 1 in 8. "Many parts of the hill," adds the writer of the account of this early hill climb, "were very soft, but by altering the connection from the engine to the wheels, as we have above described" (i.e., changing the gears) "the drag, with the coach attached and nine persons, were conveyed to the summit, a distance of 700 yards, in 9 minutes."

FOREIGN TRADE PROMOTION WORK

In furtherance of the plans of the Bureau of Foreign and Domestic Commerce to make its work more directly helpful to manufacturers and exporters of the United States, attention is invited to its facilities for supplying information in regard to trade conditions abroad, changes in foreign customs-tariff rates, and regulations governing the entry of goods through foreign ports.

The Bureau is charged with the duty of "developing the various manufacturing interests of the United States and markets for their products at home and abroad, by gathering and publishing useful information, or by any other available methods." In this work the Bureau has the co-operation of American consular officers. In addition it is provided with a corps of commercial field agents who submit comprehensive reports with respect to foreign markets for specific lines of products. The office is a clearing house for the dissemination of the reports submitted by these officers. Trade reports are published in a daily bulletin, in special monographs, and circulars. Information concerning foreign customs tariffs, port charges, consular regulations, etc., is collated and published, especial effort being made to keep manufacturers advised of current changes in such rates and regulations.

In this connection the Department is sending out an information blank to be filled by manufacturers with information for the use of the Department in the manufacturers' interest, and the information yielded as the answers to the questions will be held in confidence. Apply for the blank. It will be worth while.

NEW RUBBER-CURING PROCESS

A Reuter dispatch from Singapore states that a demonstration of the process of curing raw rubber with vapor was carried out on the Sione estate at Kuala Lumpur in the presence of the Chief Secretary, the Director of Agriculture, and a number of planters. The process occupied two hours.

THE WAY THEY ADVERTISE ABROAD

Here is how the motor car builder of this country puts his case when he is addressing a foreign public:

"The K. R. I. T. is NOT an American car of the cheap and nasty description, but essentially high grade, and design follows the best principles of European car manufacture."

CHANGE OF NAME

Beginning with the July issue, the Railroad Man's Magazine will be called The Railroad and Current Mechanics. This new department will be very fully illustrated and will furnish information, as well as entertainment, to railroad men who have to do with mechanics.

Wants

Help and situation wanted advertisements, 1 cent a word; all other advertisements in this department, 5 cents a word; initials and figures count as words. Minimum price, 30 cents for each advertisement.

PATENTS

Patents—H. W. T. Jenner, patent attorney and mechanical expert, 606 F St., Washington, D. C. Established 1883. I make a free examination and report if a patent can be had and exactly what it will cost. Send for circular.

SITUATION WANTED

Blacksmith Foreman—Many years experience, buggies, carriages and wagons for the trade. P. Steinbrecher, 5014 Stewart Ave., Norwood, O.

Business Promotion Through Trade Press Efficiency

is to be the keynote of the most notable gathering of technical, class and trade journal editors and publishers ever held in America. No live manufacturer, sales manager, advertising man, trade paper editor or publisher can afford to overlook the

Eighth Annual Convention of the Federation of Trade Press Associations in the U. S. at the Hotel Astor, N. Y., Sept. 18, 19, 20, '13

Two sessions will be held daily. There will be editorial, circulation, advertising and publishing symposiums under competent leaders. Many of the leading editors, business managers, buyers and sellers of advertising, and authorities on modern merchandising methods will take part. On Friday afternoon, September 19, there will be a mass meeting with addresses by representative business and professional men, on subjects of timely interest to editors, publishers and advertisers. Distinguished guests and worth-while speakers will be at the annual banquet, which will be made a memorable social occasion. No matter what may be your connection with the trade journal field, if you are interested in the idea of business promotion through trade press efficiency, if you believe in business papers for business men, you will be welcome at all sessions.

Full information may be obtained from

The Committee of Arrangements

WM. H. UKERS, Chairman, 79 Wall Street, New York

The Federation of Trade Press Associations in the United States

President	Secy.-Treas.	Vice-President
H. M. Swetland	Edwin C. Johnston	E. C. Hole
New York	New York	Chicago

INDEX TO ADVERTISERS

CUSTOMER·A·SATISFIED·CUSTOMER

BECAUSE, those cup-like studs that you see in our illustration will grip the ground just where, and just when, the ground needs gripping; so that he is free from the danger of skidding and slipping.

BECAUSE, his tire EXPENSE account will show a difference such as will cause him to talk enthusiastically to others about you and the RACINE AUTO TIRE.

All this counts for good business; so get busy. The RACINE AUTO TIRE is going into the hands of live, pushing dealers. We shall make it equally advantageous to them as to us. Be amonst the live ones. Take our proposition. Do it now; and together let us do it thoroughly.

RACINE AUTO TIRE COMPANY

500 14th Street **RACINE, WISCONSIN**

PORTER'S BOLT CLIPPERS

"Easy" "New Easy" Allen-Randall

To Cut 5-16, 3-8, 1-2, 5-8, 3-4 Inch.

H. K. PORTER, **EVERETT, MASS.**

Richard Eccles Co., Auburn, N.Y.

Manufacturers of

Forgings: Carriage, Wagon, Automobile' Special

Send for Catalogue No. 17.

PHILIP LEBZELTER & SON CO.

Lancaster, Pennsylvania

Manufacturers of

Automobile and Carriage

WOOD-WORK

Manufacturers of

HARDWOOD LUMBER

AUTOMOBILE
JOHN A. GIFFORD & SON
25 PARK PLACE
CARRIAGE MATERIALS
22 MURRAY ST.
NEW YORK.
HARDWARE & TRIMMINGS

Jones Wheels

BEST ON EARTH

KANTSAMORE

Phineas Jones & Co.

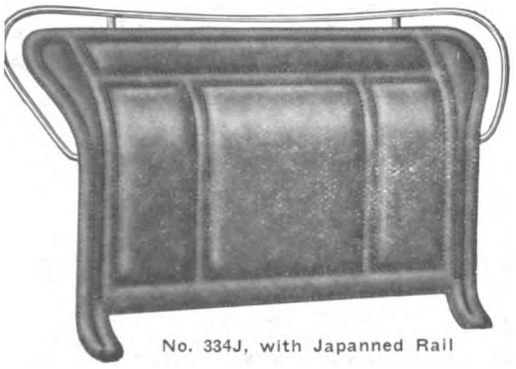
NEWARK, N. J.

Branch Factory:

12th Ave. and 55th St., New York City.

BUSY BUYERS BRIEFS

McKINNON DASH COMPANY



No. 334J, with Japanned Rail

BUFFALO, N. Y.

TROY, OHIO
CINCINNATI, OHIO

ST. CATHARINES, ONTARIO

Japanned Rails

ARE IN GREAT DEMAND

On account of their attractive appearance and durability

"BLACK VELVET" CUSHION SPRINGS

Manufactured Only by the

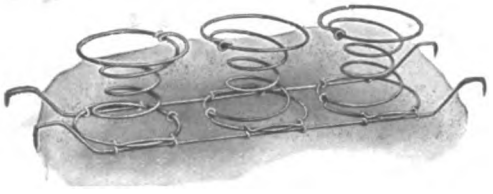
NATIONAL SPRING AND WIRE COMPANY

ALBION, MICH. WINDSOR, ONT.

THE SPRING OF QUALITY.

SPRING or SOFT EDGE CUSHION FRAME

For Buggies or Other Vehicles. Built of the Highest Grade of Steel Wire.



STRIP FOR WOOD OR BOX FRAME

—WILLEY'S—

COLORS

The RECOGNIZED STANDARD

C. A. WILLEY CO.

COLORS GRINDERS

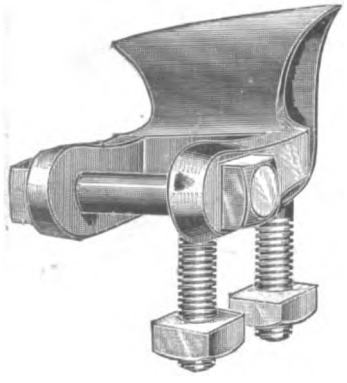
and Manufacturers of Specialties in

CARRIAGE, AUTOMOBILE AND CAR

PAINTS

COLORS, VARNISHES, ETC.

HUNTER'S POINT, NEW YORK CITY



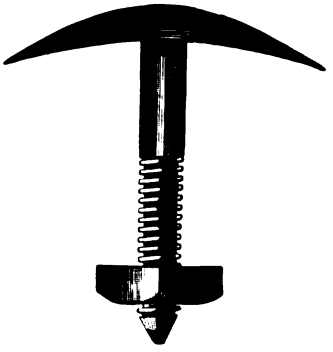
Skewed Shaft Couplings

Regular or Oval Patterns
For High Arched Axles

Furnished in rights and lefts for any height of arch. Oval Axle Clips 5/8 or 3/4 width to match Oval Couplings. Bolts, Clips, Couplings, Carriage Hardware and Special Forgings

Catalogue "H" and Prices on Application

COLUMBUS BOLT WORKS, Columbus, O.

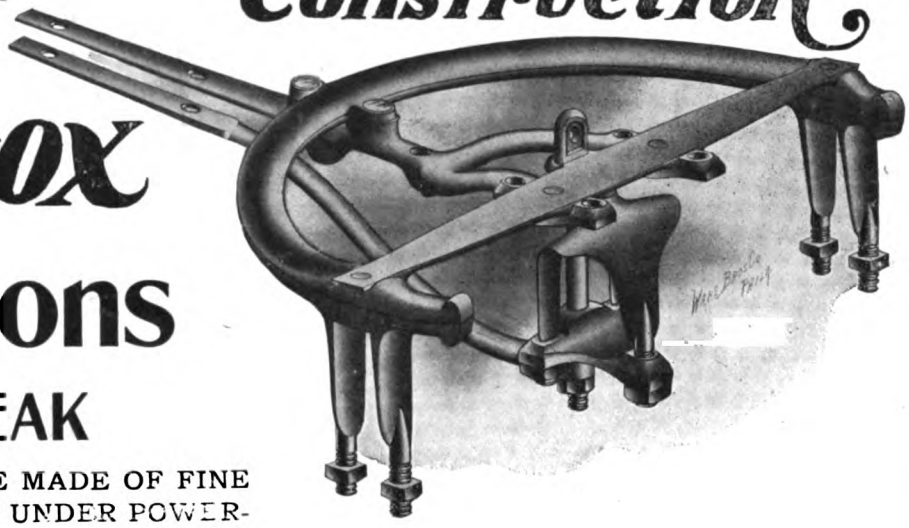


The Hub

TRADE NEWS PUBLISHING COMPANY
24-26 MURRAY ST. NEW YORK

STRENGTH

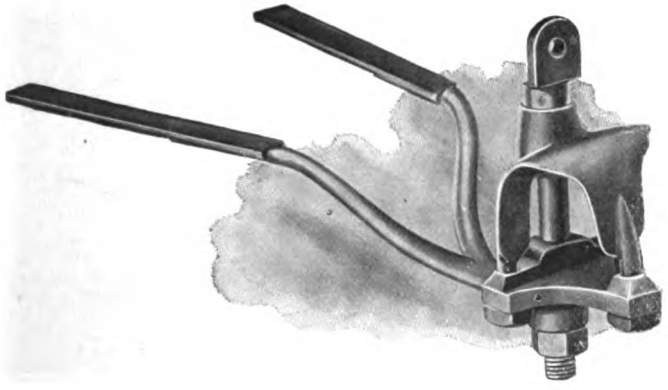
IN Gear Iron Construction



Wilcox Gear Irons

NEVER BREAK

THIS IS BECAUSE THEY'RE MADE OF FINE STEEL AND DROP FORGED UNDER POWERFUL STEAM HAMMERS



This Three Prong Rear King Bolt

MAKES STRONGER CONSTRUCTION POSSIBLE, BECAUSE THE AXLE DOES NOT REQUIRE BORING. THE KING BOLT PASSES BEHIND AXLE THROUGH A YOKE, AND IS DOUBLE LOCKED IN HEAD-BLOCK AND YOKE. THIS COMBINATION POSITIVELY PREVENTS RATTLING

WILCOX GEARS ARE MONEY SAVERS FROM A CONSTRUCTION STANDPOINT. EXPERT MECHANICS ARE NO LONGER REQUIRED IN YOUR ASSEMBLING ROOM. A BOY CAN PUT A WILCOX GEAR TOGETHER AS READILY AS A MAN, BECAUSE IT IS DRILLED IN EVERY PART BEFORE BEING SHIPPED. WE MAKE GEAR SETS IN SINGLE AND DOUBLE PERCH, FULL DESCRIPTIONS OF WHICH ARE CONTAINED IN OUR ILLUSTRATED No. 11D CATALOGUE. WRITE FOR A COPY TODAY

The D. Wilcox Mfg. Co.

Mechanicsburg, Pa.

The Hub

Entered in the New York Post Office as Second-class Matter

Vol. LV JUNE, 1913 No. 3

THE TRADE NEWS PUBLISHING CO. OF N. Y.
Publishers of THE HUB

J. H. WRIGHT, *President.* G. A. TANNER, *Secretary and Treasurer.*
24-26 MURRAY STREET, NEW YORK.

Other Publications of Trade News Publishing Co.:
HARNESS (monthly).....per year, $1.00
AMERICAN HARNESS AND SADDLERY DIRECTORY (annual).....per copy, $4.00

THE HUB is published monthly in the interest of employers and workmen connected with the manufacture of Carriages, Wagons, Sleighs, Automobiles and the Accessory trades, and also in the interest of Dealers.

Subscription price for the United States, Mexico, Cuba, Porto Rico, Guam, the Philippines, and the Hawaiian Islands, $2.00, Canada, $2.50, *payable strictly in advance.* Single copies, 25 cents. Remittances at risk of subscriber, unless by registered letter, or by draft, check, express or post-office order, payable to the order of TRADE NEWS PUBLISHING CO.

For advertising rates, apply to the Publishers. Advertisements must be acceptable in every respect. Copy for new advertisements must be received by the 25th of the preceding month, and requests to alter or discontinue advertisements must be received before the 12th day of the preceding month to insure attention in the following number. All communications must be accompanied by the full name and address of writer.

FOREIGN REPRESENTATIVES:

FRANCE.—L. Dupont, publisher of *Le Guide des Carrossier*, 78 Rue Boissiere, Paris. Subscription price, 15 francs, postpaid.

GERMANY.—Gustave Miesen, Bohn a Rh. Subscription price, 12 marks, postpaid.

ENGLAND.—Thomas Mattison, "Floriana," Hillside Avenue, Bitterne Park, Southampton. Subscription price, 12 shillings, postpaid.

Entered in the New York Post Office as Second-class Matter.

Selling Automobiles

Only a little more than a year ago this journal poked fun at the selling methods of motor car makers and salesmen, and told the truth as it was gleaned from observation as well as hearsay. We also indulged in opinionated comment on the way the thing was done and freely predicted that such slip-shod methods must soon pass away. We may have been a little "funny" at the expense of the gaily upholstered salesmen of those days, but all we said was from the point of view that it wouldn't do, and that staid business methods would have to be adopted because the time was near at hand when the supply would overhaul the demand.

We were privileged to see a letter from an accessory source a little while after the expression of one of these editorial opinions. The letter was private, written by a friend to a friend, and The Hub was set upon in round terms of almost abuse, and the burden of the plaint was that the journal should be a booster, not a knocker.

It is one of the weaknesses of a class of men, larger in number than in influence, that the present state of things should not be interfered with, and that everything that is, is good, so long as the pork is juicy, and the chunks large. Killing and eating the fatted porker is always satisfying, but it is only when the next meal is wanted that the sober second thought has its due influence.

It is the province of a class journal to be on the lookout for the best interests of its trade, not only now but hereafter, and to tell the facts, also to comment upon them, to the end that good may come of it.

We now find that the wise men of the trade are taking up our point of view. The fact that they should have seen the light a year ago is nothing detrimental. They may have been boosters then, too. But it needs brains instead of buckram to sell cars now.

We quote with much satisfaction Mr. W. C. Poertner, a distributor of National cars, who, in consideration of advertising space no doubt, has had himself quoted in one of the daily prints. Let us see what he has to say:

"Has the selling of automobiles reached a true state of legitimate merchandising? Are automobile dealers in the same class and on a parallel with merchants in other lines of retail business? These questions if put right up to sellers of motor cars would doubtless cause a debate the equal of which could only be heard in Congress.

"For evidence that the selling of automobiles has long since passed the stage of champagne and extravagance, it is only necessary to contrast the selling season of a few years ago with the present selling season. Today the market is so keen and competition so open that every known legitimate practice in modern retailing, and a lot that are not known, are employed in the sale of a motor car.

"Instead of customers fighting for a car and offering to pay most any kind of a price for it, dealers are fighting each other to give the customer the best of it, and if the buyer holds out long enough he is certain to get just what he wants and exactly when he wants it. And in place of spending half of his time in some automobile show room practically begging for a car, he is apt to spend all day in his office seeing salesmen or representives from a dozen or more dealers, with knowledge that he is in the market for a car.

"With more than a half million cars being made and sold this year, no one then can deny that the retailing of automobiles requires not only legitimate merchandising methods, but merchandising of the best organized business knowledge, more efficient and effective than that of any other line of business.

"The 22-calibre man in the automobile business no doubt would resent being classified as a merchant, pre-

ferring to stand on a self-erected and inflated business illusion. But the 44-calibre man keeps in step with the business progress and welcomes an opportunity to engage systematic methods acquired by study and application as applied by big business executives. Therefore, from necessity the modern automobile dealer has unhitched himself from a very early retail selling tradition."

The Approaching Convention

The C.B.N.A. convention, to be held in St. Louis, October 13-16, will be one of unusual interest, due to the location.

St. Louis is so central to the wholesale building interests, and taps so conveniently a large section filled with builders also whose product is small, speaking in a comparative sense, that the meeting should be great in point of numbers in attendance.

The city contains several vehicle organizations of a social-business character, and their interest, effort and sympathy will go far towards the perfection of arrangements that will make visitors feel at home.

The big men in the St. Louis trade all measure up to very broad gauge standards, and when they give the signal, "full speed ahead," there will be no unresponsive or laggard committees, so St. Louis ought to be memorable as yielding a fine meeting.

The Coliseum is a splendid building for exhibition uses, although, big as it is, it may turn out not quite big enough for association purposes, due to the fact that the area of the flat floor space only is available for the use of the exhibitors. This comes about by reason of the spaces required being so various in dimensions that a regular, uniform and rectangular arrangement cannot be plotted. The result is the consumption of many square feet of space to accommodate the differing sizes that become unavailable for space use, hence are wasted. This eats up the available exhibition space at a surprising rate, and is not well understood by any save those whose business it is to tackle the problem.

But we suppose this will all be worked out satisfactorily in the end, and every exhibitor be accommodated with room enough to show the goods he is interested in.

There is one hint about such matters that cannot be made too plain, it is that the early applicant for space is the one who fares the best, and the late comer is often put to it to get what he thinks he should have to serve his interest best. The conclusion is obvious: Apply now!

There is an intention abroad by some moving spirits to try and have the deliberations of the convention body full of human interest this time, and a purpose is expressed to compel an attendance at the meetings that shall be in the nature of a reward for the effort made.

How this will turn out cannot be forecasted, but the plan is so desirable that all should try to aid its success.

We publish in this issue the secretary's announcement which should be read by intending exhibitors particularly, because every question likely to be asked about space, etc., is there set forth and answered.

CARRIAGE BUILDERS' NATIONAL ASSOCIATION

CONVENTION AND EXHIBITION

St. Louis, Mo., October 13 to 16, 1913
Business Meetings, October 14, 15 and 16
Exhibition from the 13th to 16th, inclusive

At a meeting of the executive committee it was unanimously resolved that all members applying for space at the exhibition be requested to exhibit the goods they manufacture or deal in, and not merely maintain an office. The exhibition is designed for the information and benefit of the vehicle trade. It is hoped that all who participate in the exhibition will comply with this request.

These are the rules governing the exhibition to which we invite the attention of all members who purpose making an exhibit this year.

You will notice that the exhibits must not be dismantled or removed, nor any preparation for removal made, until after 6:00 p. m. on Thursday, October 16. All exhibits must be removed from the hall by noon of Friday, the 17th, as our lease terminates at that time.

We would suggest you notify your representatives to stay with your goods and see that they are properly delivered to the transfer company for shipment. No other persons can do this nor tell if all have been shipped. This will prevent confusion. No one can tell to whom they belong, or where they are to go, nor can any one tell if they are properly cared for, unless the owners stay by them until they leave the hall. Please so instruct your agents.

The St. Louis Transfer Co. will deliver freight shipments from depots of railroad companies to the Coliseum and return them to the railroad station for reshipment at the following rates:

Consignments weighing over 300 pounds, round trip, per net ton	$8.00
Consignments weighing over 300 pounds, one way, per net ton	4.00
Consignments weighing under 300 pounds, round trip	1.50
Consignments weighing under 300 pounds, one way	.75

Shipments arriving prior to the time that delivery can be effected at the Coliseum will be stored at owner's risk at regular storage rates.

Shipments should be consigned in care of St. Louis Transfer Co. at East St. Louis. Freight charges to St. Louis should be fully paid, and notice of shipment or bill of lading mailed to The St. Louis Transfer Co., 400 South Broadway, St. Louis, Mo., advising them when the exhibitor's representative will be at the building.

This information is from the Transfer Co. Payment for its services should be made direct to the Transfer Co.

Edw. A. Langan Furniture Co., 2004 Morgan street, St. Louis, Mo., has in stock and will rent furniture for exhibition purposes at the following rates:

3-foot golden oak roll-top desks	@ $5.00
4-foot golden oak roll-top desks	@ 5.00
4-foot golden oak flat-top desks	@ 4.00
Golden oak revolving chairs	@ 1.50
Golden oak arm chairs	@ 1.00
Golden oak side chairs without arms	@ .50
Golden oak 6-foot tables	@ 1.50
Golden oak 5-foot tables	@ 1.25
Golden oak 4-foot tables	@ 1.00

Domestic rugs, 9 x 12 feet, from $3.50 to $5.00.

You can call at place of business and select what you need.

This information is for the exhibitors, the association having no further interest in it.

We invite your attention to the following extracts from the minutes of the executive committee as published:

"In relation to the order made at the Chicago convention relative to soliciting orders on the exhibition floor, the execu-

tive committee desires to call all members' attention to this, as they think a moment's reflection on the part of those not having any exhibit will convince them that it is unfair to those who have made the exhibition hall their office and salesroom for the time being, and paid for this opportunity to meet the vehicle trade, and that it is not right for any one not exhibiting to come on the floor and solicit trade that rightly belongs to those who have exhibits.

"As any member can obtain space at these exhibitions if they desire to look for trade at same, they should take space and be on an equality with those who do.

"All members are welcome to visit the exhibition, but fairness to those who pay for the privilege of exhibiting should prevent all from making unfair use of this privilege."

The following resolution was passed at the convention at Chicago in 1908:

"Resolved, That the secretary of the C.B.N.A. be instructed by the association to adopt such regulations as to exclude from the exhibit hall all representatives of the accessory trades that are not members of the association.

"Resolved, That the exhibitors and their representatives be furnished with a badge showing they are exhibitors or representatives of the same."

In accordance with the above resolution, the executive committee has arranged that the admission to the exhibition hall shall be by ticket, to be procured at the entrance door on registration.

This ticket will be provided free to all members of the association, both active and associate.

And also to all carriage, wagon, sleigh, automobile and motor car builders who are not members of the association.

But not to any manufacturer or dealer in accessory goods who is not a member of the association.

Exhibitors will be provided with badges for themselves and their attendants as the above resolutions call for, and these will be delivered to them on the first day the exhibition is open.

These resolutions can only be made effective with the cooperation of the exhibitors, and the committee requests all the exhibitors to aid in enforcing this rule.

We would also suggest that you instruct your representatives to carefully obey the rules as printed.

By order of the executive committee.

HENRY C. McLEAR, Secretary.

ANGLO-AMERICAN EXPOSITION, LONDON, MAY TO OCTOBER, 1914

The object of the Anglo-American exposition is to celebrate in a fitting manner the hundred years of peace and progress between the English-speaking people since the treaty of Ghent in 1814. What more appropriate means could be adopted to commemorate these epoch-making events than to materialize in a magnificent joint display the vast gains which have accrued to mankind through this peaceful development of Great Britain and the United States of America of the past century? The exposition will be held in London between May and October of 1914, and is intended to demonstrate in a practical manner the progress which has been made by the British and American people in every branch of civilization during that century, and will place on view in chronological order the great achievements of that epoch—from inception to perfection—showing not only how each nation has improved on its own inventions, but also where both have worked hand in hand to perfect the creation of the other.

Thus there will be unfolded the rich treasures of a hundred years of the history of the two nations.

No exposition has ever been afforded such unique and interesting opportunities, and certainly there never was an occasion more fitting for a great exposition of the work and achievements of two nations of the same blood, celebrating their hundredth anniversary of peace and concord, where people of the same family, but separated by a great ocean, will be able to join hand in hand to unite in shaping their mutual destinies, and as kinsmen advancing the welfare of humanity and of the whole civilized world.

Great Britain is now the largest customer of the United States and the United States is a valued consumer of British products; and the conjunction of the respective products of the two countries will provide a suitable stimulus for the still further increase of their mutual trade.

The exhibition palaces, containing over 500,000 square feet of floor space and entirely fireproof, have been erected in the most beautifully laid out grounds with its gardens, lakes, and lagoons. These buildings are now ready for the reception and installation of American and British exhibits, practically a year before the opening of the exhibition, fixed for May 1, 1914. The plant, which shows the allotment of the various buildings to the different class of exhibits, gives also a comprehensive idea of the importance of the scheme.

The exposition grounds at Shepherd's Bush, within 15 minutes of the center of London's main thoroughfare, covers over 100 acres. The main entrance is connected directly with the various termini, capable of conveying to the spot over 80,000 persons per hour, or nearly a million visitors per day.

The great stadium (the largest in the world), which has a seating capacity for 100,000 people, will form part of the exposition.

The Board of Trade has certified the Anglo-American as an International Exposition, and as coming under the provisions of the Patents, Designs and Trade Marks Act of 1883.

STANDARDIZING THE CATALOGUE

The observations following appeal strongly to anyone who has had to keep track of numbers of catalogues.

There is a universal opinion that catalogue sizes should be standardized.

The standard of 6 x 9 inches has for so many years met with such wide acceptance, probably two-thirds of all the catalogues that are now made being either that size, trimmed as closely to exact size as possible, or within ¼ inch of it in one or both dimensions, that it may be considered as too well established ever to be abolished.

The 6 x 9 size is too small for many purposes, and it is necessary to have for some purposes a size which is about 8 x 10½ inches or 8½ x 11 inches.

Large manufacturing concerns have spent a great deal of money in having cuts and electrotypes made for these two large sizes, some using one size and some the other, so that it is not to be expected that either size can be abolished.

There is no serious objection to having both sizes remain as acceptable standards. Both of them are in use as standard sizes of letter paper, and both may be conveniently filed in the same filing case.

The 9 x 12 inch size has been adopted by a few for very large catalogues. While it is generally acceptable for technical and trade journals, it is rather too large for a catalogue, unless it is to be a large cloth-bound book, to be placed on a shelf and not filed in a cabinet. It should, therefore, not be recommended as a standard for common use.

For paper covered catalogues intended to be permanently filed, the edges, including the cover, should be trimmed to exact size. No fancy deckled edge or dark tinted paper should be used.

Overlapping edges of the cover are permitted when the catalogue is bound in covers stiff enough to support its weight in boards or heavy card paper.

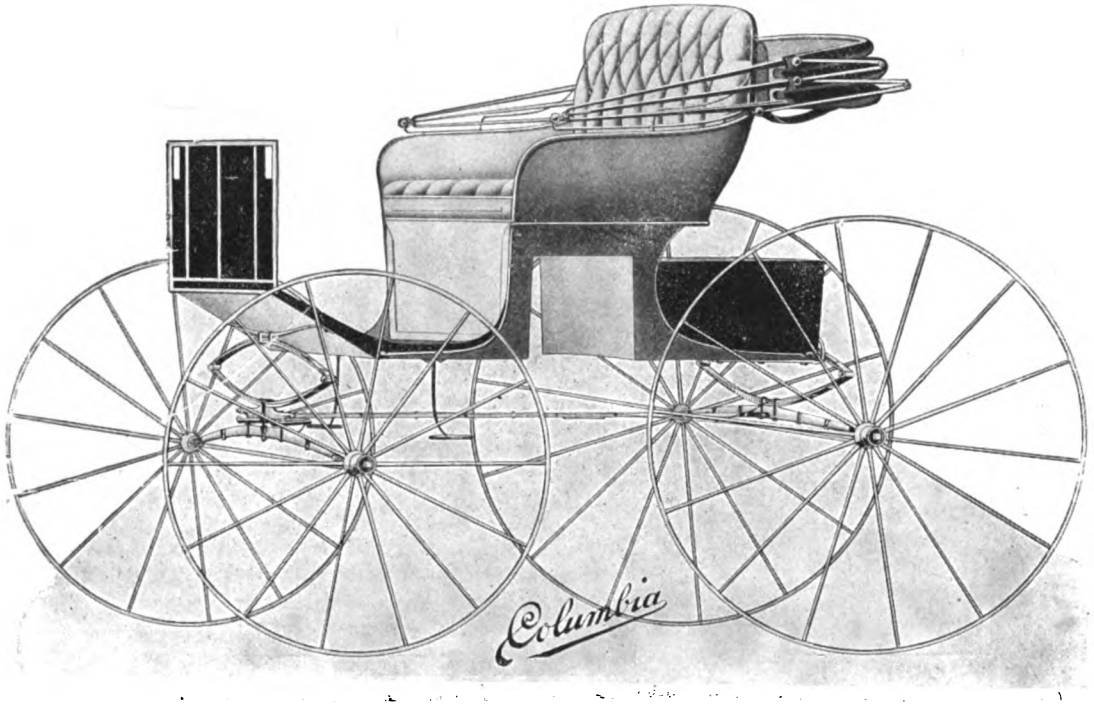
The title should always be printed on the exposed back of the catalogue, even in very thin stitched books, for the purposes of identification.

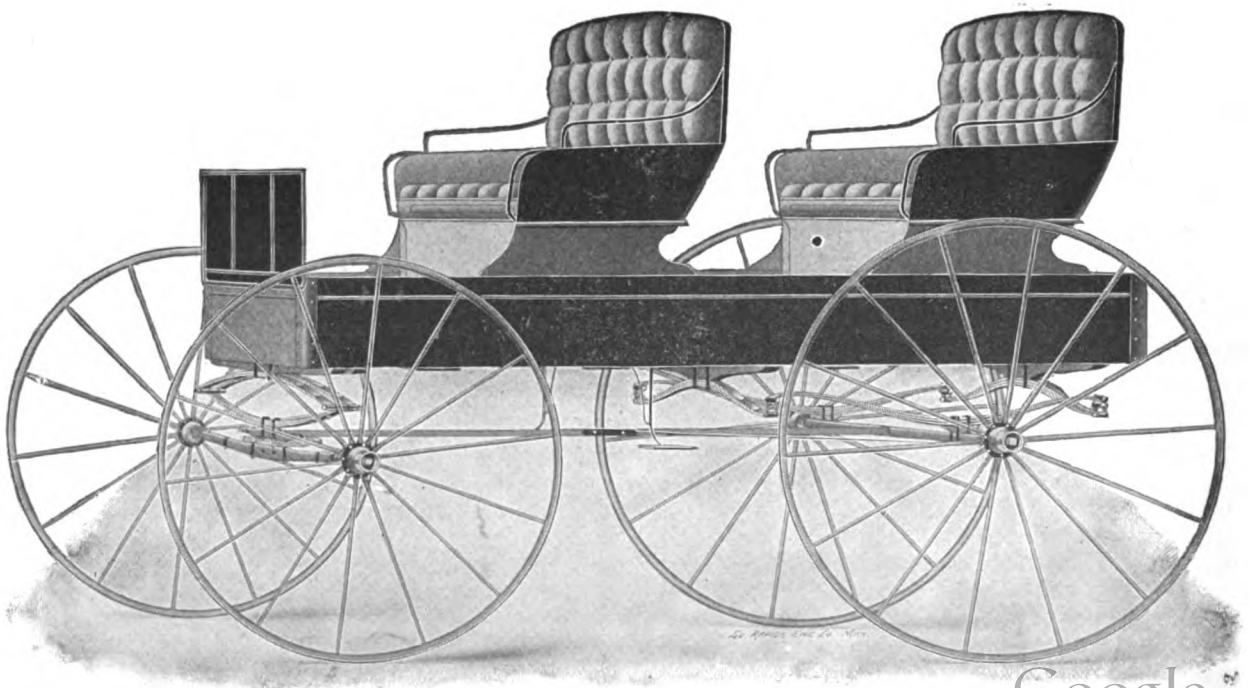
Every catalogue should have a date on its title page.

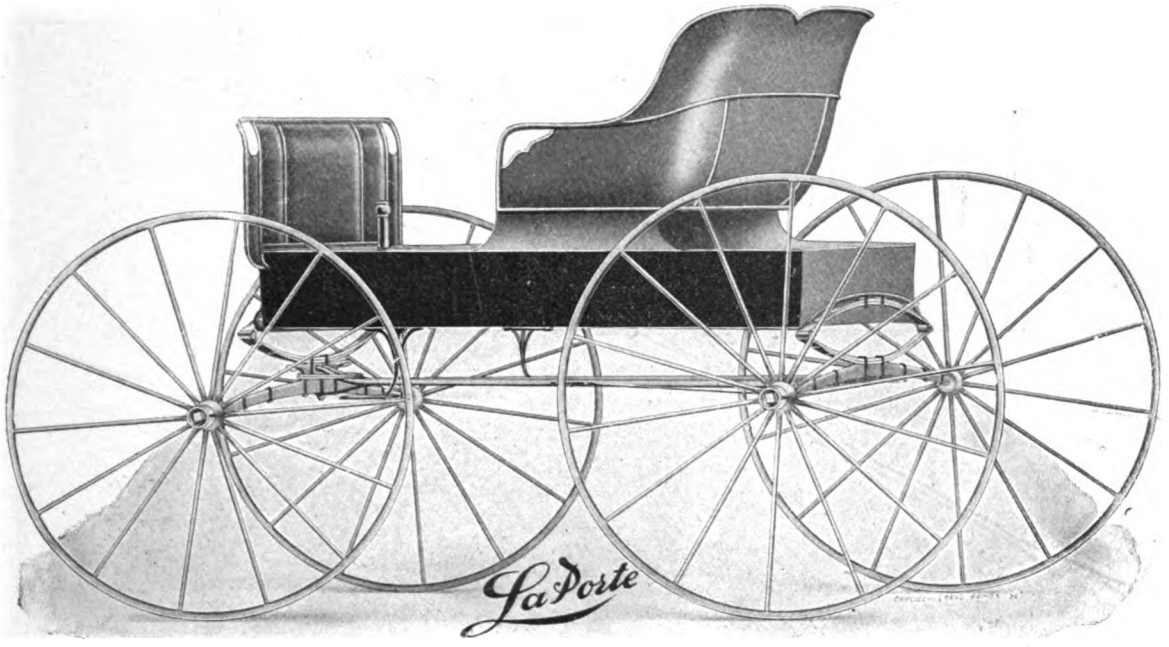
A standard size index card 3 x 5 inches should be inclosed in each catalogue, with the title of the book and a brief statement of the character of its contents printed on it.

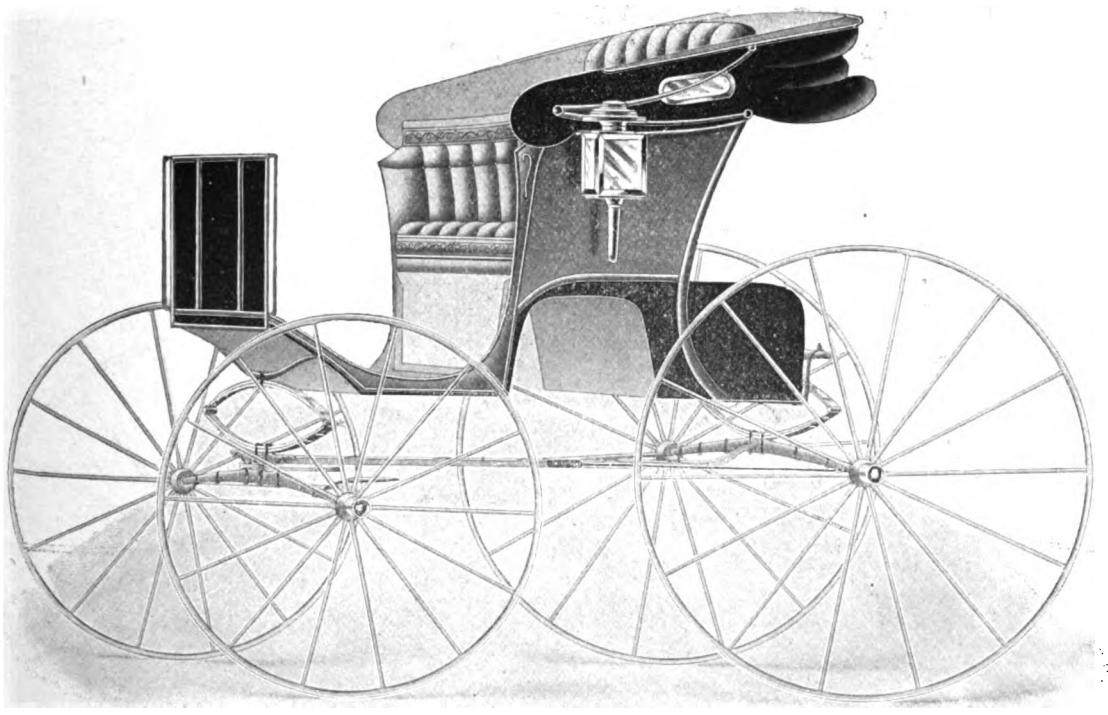
WHAT THE WHOLESALE MANUFACTURERS ARE MAKING.

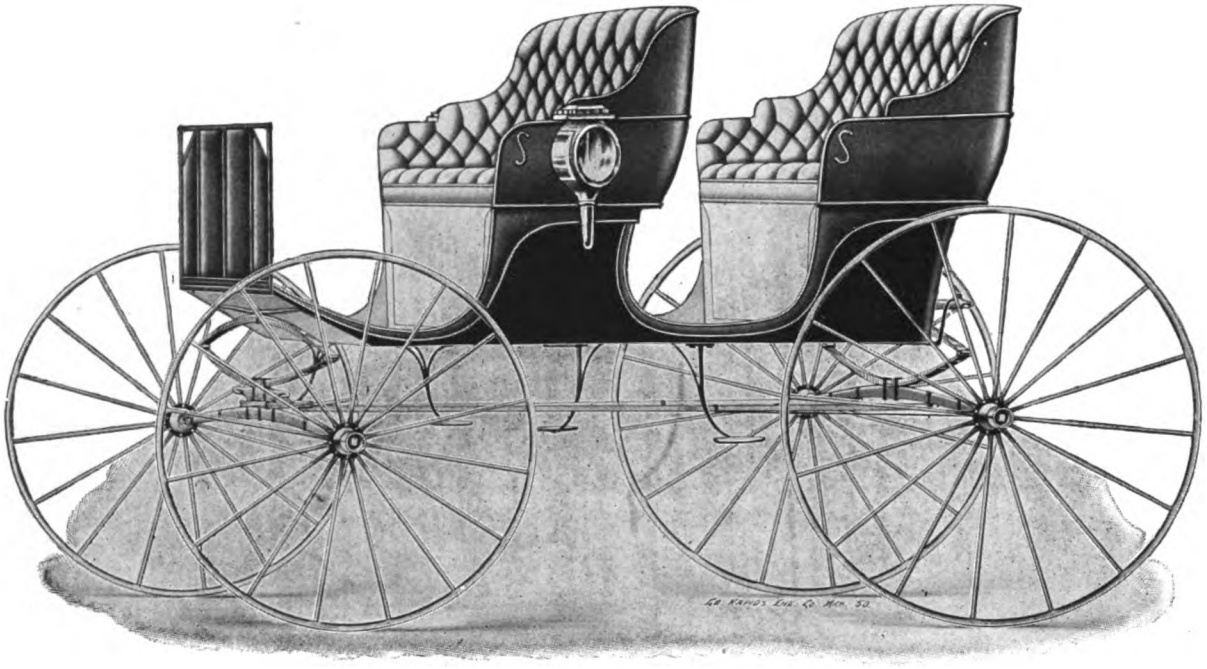
SAMPLE STYLES FAVORED BY SECHLER, La PORTE, BROCKWAY, MOLINE, FULLER, COLUMBIA.

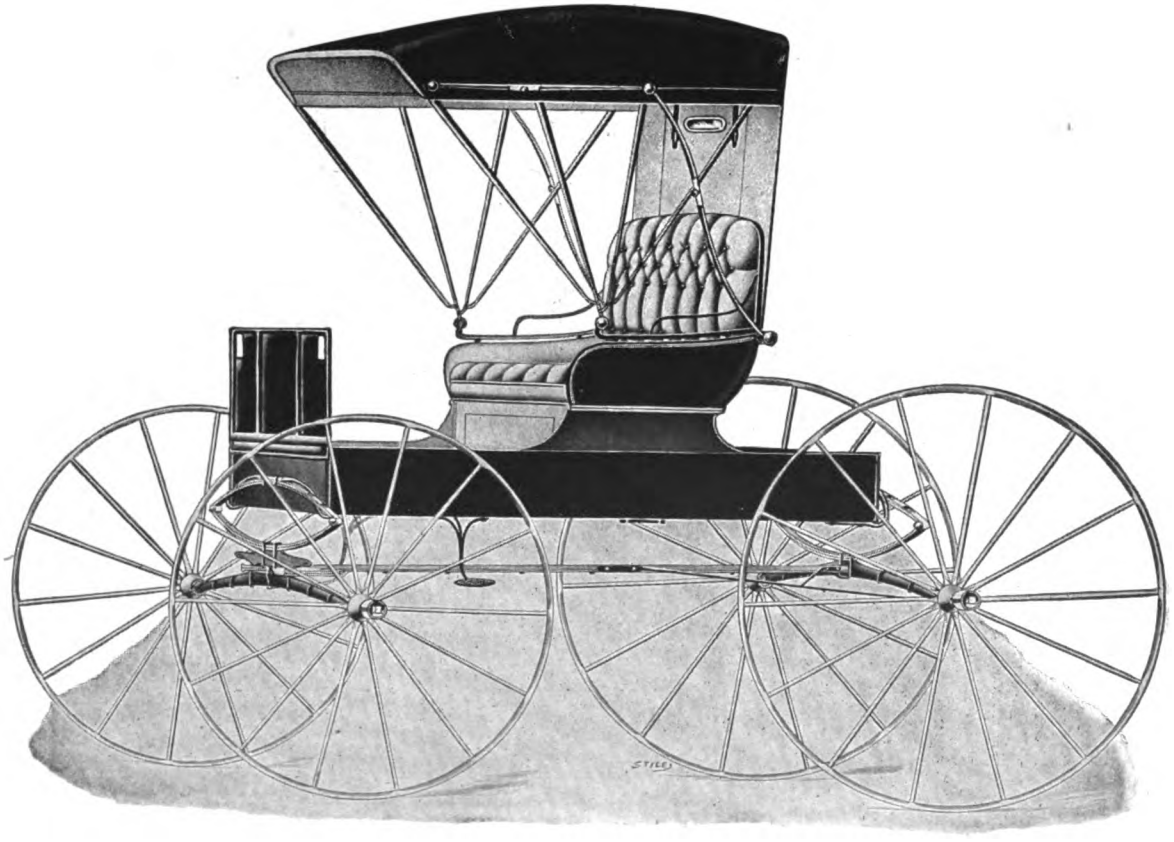


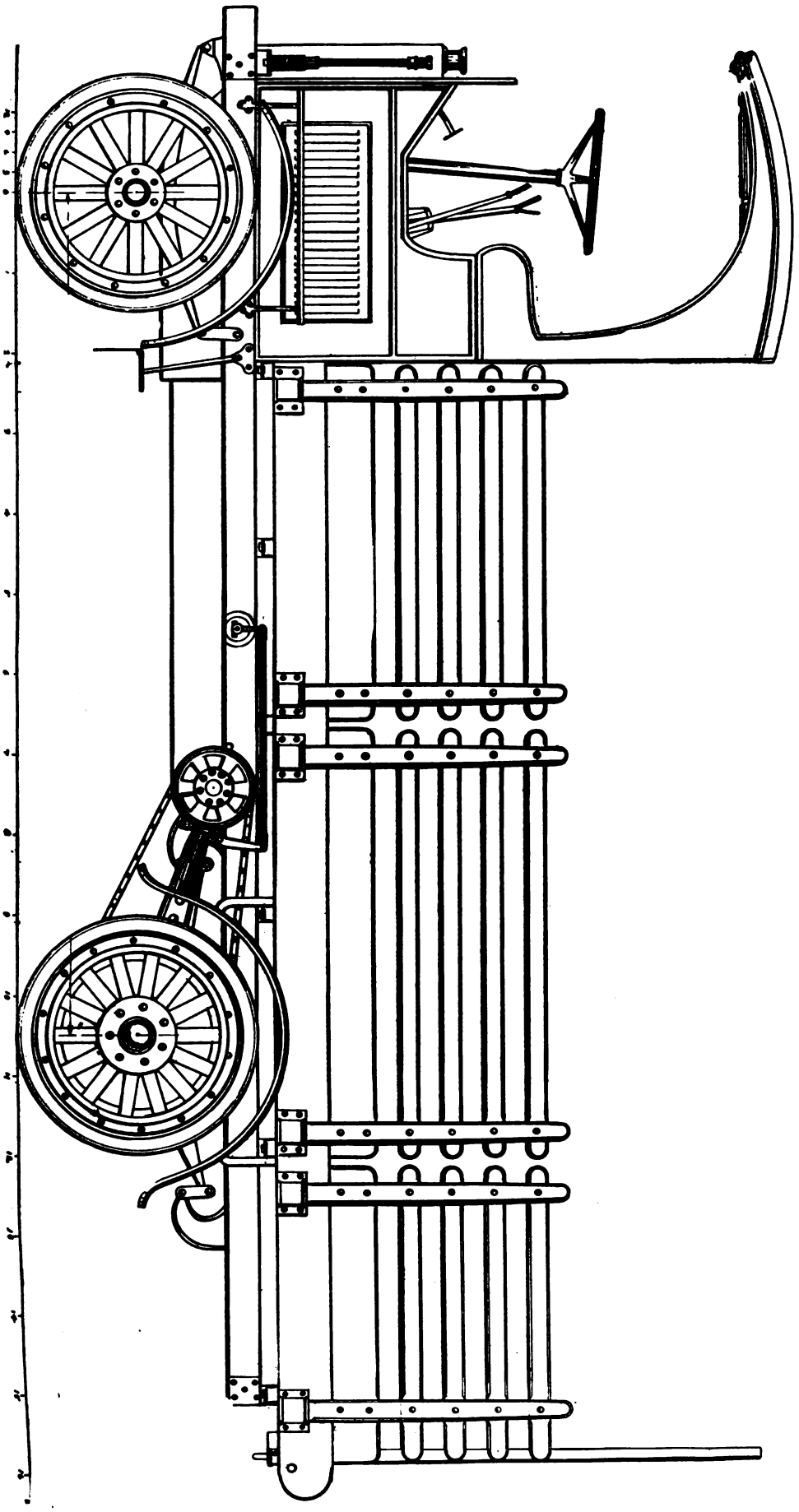




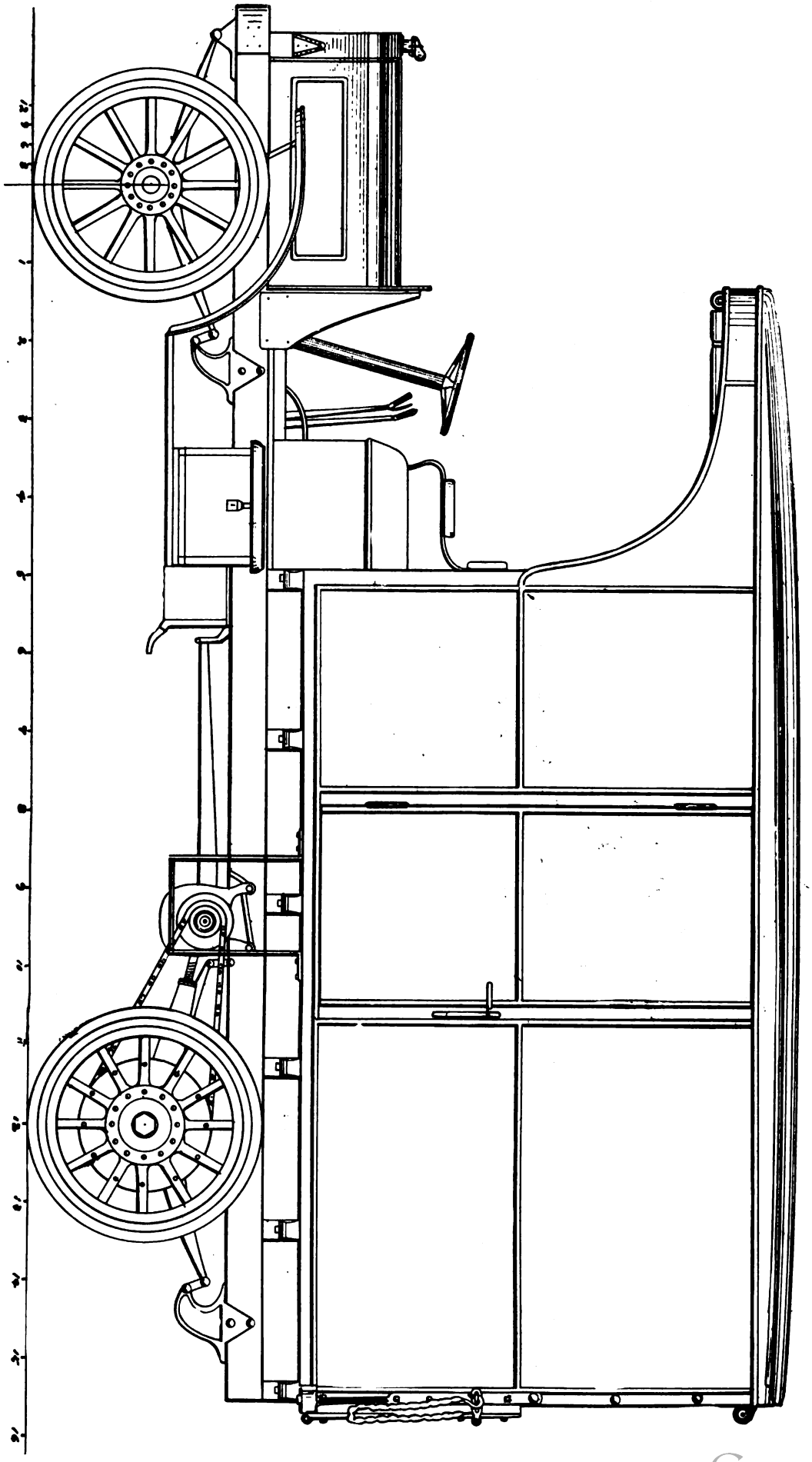








RACK BODY COMMERCIAL TRUCK
(See rear elevation in descriptive article)



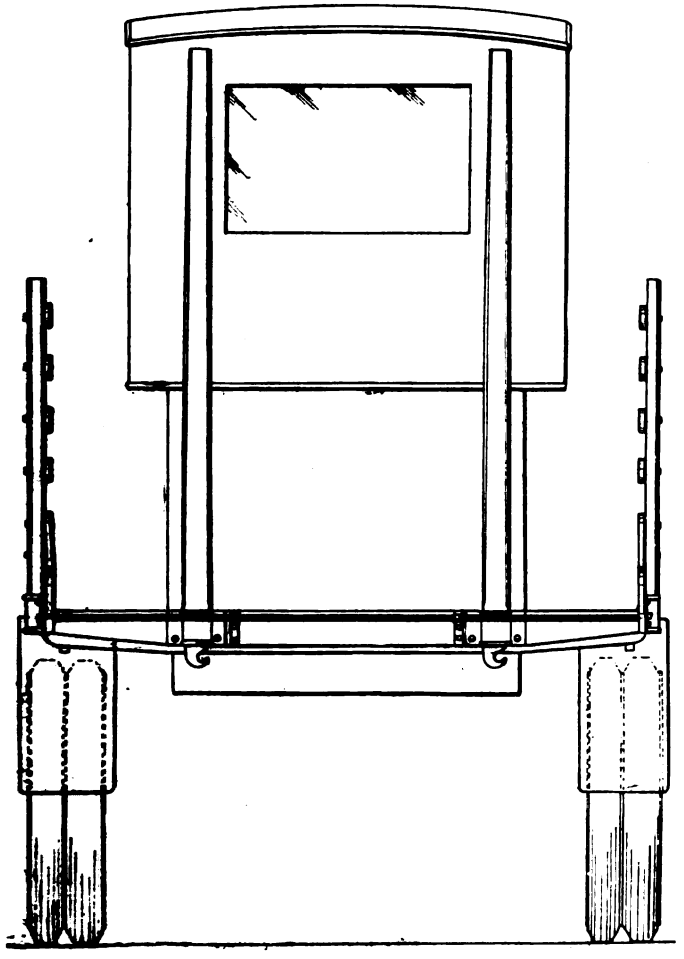
CLOSED SIDE BODY COMMERCIAL TRUCK
(See rear elevation in descriptive article)

TWO COMMERCIAL BODY DESIGNS

(See illustrations)

Two designs of commercial bodies of standard types are here illustrated. The side and rear elevation is shown and the bodies are mounted, one on a Packard three-ton chassis with 12 ft. wheel base and the other is mounted on a three-ton Pope-Hartford chassis with 10 ft. 6 in. wheel base.

The first design, or that on the Packard chassis, is one of a closed side body, with side doors and tailgate. It is intended for bulky merchandise, such as cases of a standard size, for



Rear Elevation of Rack Body Truck

instance, cases of mineral water. The body can be equipped with racks and the load is removed both from the sides and the rear. There are rope hooks for holding the load and also the tailgate can be used for excess packages.

The interior dimensions are: length, 10 ft. 6 in.; width, 4 ft. 2 in., and height, 6 ft. in the clear. The tailgate is 31 in. above the floor and the side chains are leather covered. The doors on the sides are 30 in. in the open and there is a folding step on each side as well as grab handles on the posts.

The top is made with side rails and sawed bows and the front of the roof is made with a bending that is not less than 6 in. wide, or the width over the horizontal mouldings at the front. This bending forms the front up to the line of the short perpendicular moulding on the side, and from this point to the front pillar the line is formed by framing that is paneled over.

The panels are ½ in. thick and they are rabbeted into the top rail and the sills and the posts and the joints covered with a moulding that is nailed on. The posts at the ends and at the doorways are 2 in. thick by 3 in. wide, and the sills are 2½ in. deep by 3 in. wide. The tailgate has four hinges and the chains at the top are fastened to a cross rod.

The body is equipped with a rear curtain and also storm apron and side curtains for the driver.

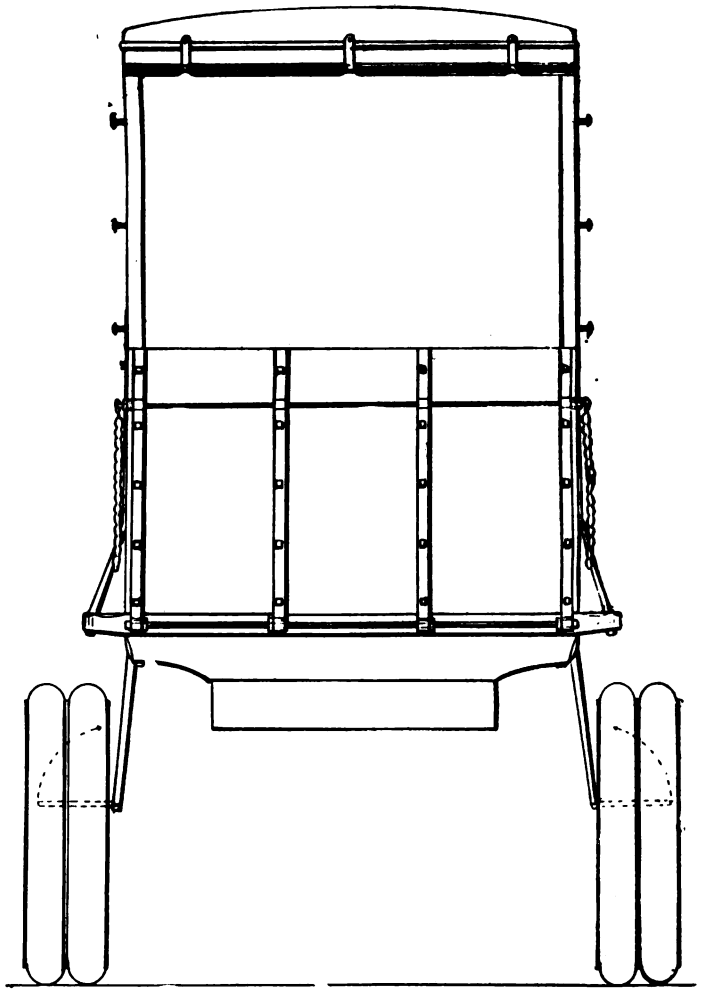
The space under the roof at the front is locker room that can be used for various purposes, according to the business to which the body is put. This room can be made useful, for example in the furniture business. This room is used to carry pictures and mirrors; of course, in that case the front requires staying by a post up from the dash.

The doors on the side are not locked. A good sensible fastener to keep the door shut is all that is required; the step is made to fold up, as there is less danger of boys riding on the side and being hurt.

This body is standard design and is used generally in the cities for the purposes mentioned above; the dimensions given are those that are required for the description of the body, but all other dimensions of the exterior of the body can be obtained by the use of the scale of measurement at the base line of the drawing.

The driver's seat is the standard seat furnished with the Packard chassis.

Design second is a rack side body and having the racks in three removable sections on each side; the chassis is the Pope-



Rear Elevation of Closed Side Body Truck

Hartford three-ton as mentioned at the beginning of the article. This body is suitable for use for the hay and grain business, or trucking or for carrying barrels. The length inside is 13 ft. 6 in., the width is 6 ft., and the height of the sides above the floor is 3 ft. 2 in. The sections can be removed at will for loading or unloading and there is a stationary lower panel that extends 5½ in. above the floor. This lower panel

is 1¼ in. thick and is plated along the top edge; it is in one sense the main sill of the body as the inner sill is cut up into for the wheel house to the under side of the 1 in. floor, so there is only 1 in. depth to the inner sill at the center of the wheel house. The inner sill is 2 in. by 2 in. and is screwed to the side panel and the cross blocking is even at the outside with the outside of the panel.

The stakes are set in pockets that are bolted right through. The lower bolts take the sill and the upper bolts are above. The two skid rungs at the rear are also set in pockets while the skid rod is a continuous bolt that passes through the panels and is bolted on the outside; there are, of course, intermediate supports for this rod.

The width of the body is practically the width of the outside of the wheels and the wheel house helps to keep the body low down for loading.

The construction of this body is quite simple; the stakes are made the size at the bottom to fit the commercial stake pocket, which is practically 2 by 3 in. and the slats are 1 in. thick by 3 in. wide and riveted or bolted to the inside of the stakes.

The skid rungs are 6 ft. long by the dimensions to fit the pocket; the cab at the front is standard equipment with this chassis, as are also the mudguards, both front and rear.

This body is slightly different from the ordinary slat sided body in that there is a low permanent side panel; that while it does take from the advantage of the platform feature of this type of body, on the other hand the tight lower side possesses an advantage for some kinds of loads.

The Hub can supply blue prints of these drawings in quantity. They are of excellent quality, in full working draft dimensions, and could be made to serve a very useful purpose to the builder.

THE CAR MAKER AND CARBURETOR

So many puzzles about car troubles can be laid to the carburetor that when an iconoclast arises and smites it, something of importance may be gathered therefrom. What follows is from Mr. A. M. Low, A.C.G.I., D.Sc., which are enough in the way of identification to indicate a very learned gent. He says:

There is no doubt that the ordinary alleged carburetor wastes about one-quarter of the fuel, not only in the actual leaks but in the way it attempts to prepare the mixture. We have our air compressed in the cylinder, and, instead of putting in a proportion of gasoline, we suddenly squirt into the air a lump of gasoline, which, naturally, has to be far too big to enable us to get anything to fire at all. The carburetor is surely a much-trusted and humorous proposition; we open a can of gasoline in one corner of the room, light a match in another, and if it explodes we say we have secured a perfect mixture. Our machines misfire if cold, when warmed slightly we say the mixture is perfect, but what happens when they get hotter? And what happens when gasoline "level," temperature, and wind, are varying independently all the time? Do we really think the "mixture" is constant, and will the explosion flames really attract themselves into one? Now, it does not follow, because you have a certain amount of air in the cylinder that a definite amount of gasoline is required because one wishes to have explosions of different speeds for different conditions, and this might be done not only by admitting the gasoline slowly, but by varying the total amount admitted. There is no doubt that, running in the ordinary way, the conditions are never correct at all, and even if they are approximately right for five minutes, they are varying in the most absurd manner the whole time to such an extent that one cannot seriously regard any form of carburetor from a scientific point of view. The amount of vapor given off by any amount of gasoline depends upon its pressure, temperature, and dryness; that is to say, whether it is more or less a "perfect" gas, or whether it contains liquid fuel finely divided in suspension. Apart from the need for plotting curves and finding out how much gasoline vapor we have under given conditions, and apart from the fact that we know a certain definite proportion of air is required to burn a definite amount of gasoline, as air contains a fairly constant amount of oxygen—we know that even the atmosphere varies in composition, and, therefore, in any cylinder, and especially at high pressures, a mixture can be local, corresponding to the burning of a gas jet in a room. The speed of combustion is one of the greatest factors determining efficiency, and the faster the gas can be allowed to expand the higher will be the efficiency, although the power might not be given off in such a manner as would conduce to overall efficiency, and it frequently pays to have a slow-burning explosion, as in the familiar example of climbing a hill "on top" at low speed. Now we can see from this very roughly what amount of gasoline is required for a vehicle, although one must assume definite transmission losses and a definite amount of thermal converter and dissociation losses in the engine. It is useless to mislead people by telling them of various complicated formula, for no fact is itself complicated, and it is both simple and accurate to state that the ordinary engine uses, under working conditions, quite 25 per cent. more gasoline than it is at all necessary. Wonderful tales of gasoline consumption should never be doubted, for the various conditions which have to exist for such consumption may have all been present by a lucky chance at the time, and this is the keynote of the absurd condition of modern carburetion. In consumption trials definition is useless; but it goes without saying that the skilled use of controls and variable gears enables advantage to be taken of running conditions to alter carburetor and gear to suit each moment of driving. So different and so many are the factors controlling the present happy-go-lucky carburetor, that comparisons are not possible between systems, but, under the same conditions, a water-cooled engine is almost bound to be more efficient than the air-cooled variety, because of the terrible way in which the gasoline is used. How can one help regarding the carburetor—unless it has some means of really producing a regular gas—as being other than on a par with the automatic inlet valve? Why, we spend hours adjusting the needles to 1/64 in., with the help of a magnifying glass, and then subject the whole bag of tricks to terrific vibration, and imagine that, because our engine fires perfectly, we are getting a perfect mixture! A perfect mixture is almost unknown except as abnormal, and it is hard to see how the atmospheric carburetor can last much longer.

SOME POINTS ABOUT CAR FIXTURES WORTH CONSIDERING BY BUILDERS

The owner-driver of a car, it is presumed, does not care to give too much attention to the machine after the novelty has worn off. It ceases to be amusing to do more than absolutely necessary work about the car, hence it has been suggested that the maker could change some things that would make it easier to keep a car in trim. An owner has the following comments to make.

To begin with, why is the radiator almost universally of polished brass? To polish a metal is to render it least able to conduct away its heat to the air. The filling orifice is placed in such a position that it is almost impossible to avoid splashing the polished top of the radiator, with a consequence of unsightly blotches with the drying off of the water. Moreover, in the event of rain, a considerable labor and time are required to remove the effects. The one thing to be said for it is appearance, and this is a matter of taste and does not afford the best solution in a great many people's estimation. For the owner-driver, the polished brass radiator is a mistake, together with all other polished brass work which is liable to be at all exposed to the elements. The only place it should be permitted is in the dashboard fittings. There is room for improvement in the attachment of the radiator to the frame. It is not sufficiently isolated from the racking stresses to which the frame is subjected in traveling over rough roads, with con-

sequent leakage sooner or later. The difficult repair jobs have been in making good leaking radiators.

Too many grease cups to be filled at frequent intervals because of too small a size.

The engine oil filter when fitted in the sump requires all oil to be drawn off before removal, which can only be accomplished by crawling under the car. The greasers on the rear end of front springs are so situated that sleeves are covered with dirt whenever turned by contact with the front tire and mudguard.

The radiator should either be painted or otherwise treated in a way which will produce a durable surface which will require only washing and will possess good heat radiating properties. It should be more flexibly attached to the frame than is usually considered necessary. Efforts in this direction are already made, but as a rule the dsigner is satisfied with one degree of freedom only. This does not appear to be sufficient, and it is suggested that another degree of freedom, at right angles to the first, should be incorporated, together with a slightly yielding bed to deaden direct shocks. The engine oil filter should, of course, be withdrawable from above without emptying the sump. It should be an axiom that lubrication for the engine, and the whole of the transmission, including all flexible and universal joints pertaining thereto, should be necessary in three places only. To this end, the engine oil filler should supply all the engine bearings, pump, fan, timing gear, and clutch spigot bearings, if the clutch is not of the plate type. If the engine and gearbox are of unit construction there will be no flexible joints between clutch and gearbox.

The second place for oil application would be the gearbox, which is already generally arranged to lubricate the selection and gear-striking mechanism. The propeller shaft, which would be of the type furnished with one universal joint only at the front end, and encased in a torque tube rigid with the back axle, would have the universal joint protected by a spherical casing attached to the front end of the torque tube. This spherical casing would have the third filler orifice attached, which would be brought out in a position close to that of the gearbox. By this means oil would be supplied to the universal joint of the propeller shaft, would lubricate the surfaces, taking the thrust, of the spherical casing, and would run thence down the torque tube to the back axle. It is probable that some sort of packing ring round the moving joint of the spherical casing would be necessary to ensure the latter always being full of oil up to the level where the torque tube joins it, otherwise the universal joint within might be starved of oil.

This system would mean addition of oil to the engine about every 200 miles, to the gearbox and back axle about every 500 miles, through orifices large and accessible, without unnatural contortions, which are certainly necessary with the majority of cars when oil is added to the back axle direct, not to mention the propeller shaft joints, which it is feared are often neglected till they audibly complain. Thus all bearings carrying the power load of the car would be properly provided for with the minimum of attention.

In regard to the spring shackle bolts, they would be provided with larger greasers than is usual, to make filling easier and less frequent. The spring seats on the back axle would be similarly lubricated, the greasers being brought into an accessible position by a connecting piece. The whole of the joints of the steering gear should be provided with large capacity greasers, which would obviate the awkward job of removing the leather covers now generally considered sufficient to contain the lubricating grease. The connections of the clutch and brake pedals, side brake and controls, are generally of the fork and eye type with a pin connecting them. The side face of each eye should be provided with a recessed annulus, to hold sufficient thick oil to last for about 500 miles running. Oil could be applied to these annuli, to completely fill them, by the ordinary forced-feed oiler, by a conveniently disposed hole leading thereto.

A car on these lines could be run every day for a week without any attention whatever beyond filling the tank, with the certainty that all bearings are properly lubricated, for on this entirely depends, given good design, the durability of the mechanism. Ten minutes once a week to turn all greasers, add oil to the three main fillers, and the application of the forced feed oiler to the minor joints would be the sum total of the routine attention necessary. In reference to tires, less frequent pumping up will be found necessary if the rubber disc in the cap which seals the hole in the valve stem is replaced by a leather disc. The rubber ones supplied are not sufficiently tough for the purpose, soon disintegrating and developing a tendency to getting inside the hole in the valve stem. As regards paint work, a matt finish is advised. Detachable wheels of the steel or wood type are preferable. Wire wheels may be lighter for equal strength, but the time spent in cleaning far outweighs advantages they possess.

Such a car will be far more serviceable and cheaper to maintain and run than the "brass and glass."

GERMAN MOTOR CAR TRADE

Consul General A. M. Thackara, Berlin, says German motor vehicle manufacturers report that 1912 was an entirely favorable year for them. It brought an expansion surpassing even in percentage that of 1911. The foreign trade grew from $14,268,000 to $21,347,000 in the course of the year, and reports of the home trade indicate as favorable a situation.

The greater part of the growth in foreign trade is accounted for by increased exportation, especially of passenger automobiles. In 1911 Germany exported 5,154 vehicles of this type, worth $10,099,000, and in 1912, 7,948, worth $15,473,000. As in 1911, the chief country of destination was Russia. Austria-Hungary was second instead of Great Britain, as formerly; Brazil was third, and Great Britain a close fourth. Shipments to Brazil increased from 359 to 965 metric tons, and other noteworthy increases were: Argentina, from 313 to 808 tons; Netherlands, from 284 to 517 tons; Austria-Hungary, from 691 to 979 tons; Roumania, from 100 to 361 tons; and Russia from 921 to 1,594 tons. Shipments to the United States fell off from 339 tons in 1911 to 89 tons in 1912, and those to Mexico from 126 to 33 tons.

Motor trucks were exported in 1912 to the number of 694, valued at $1,849,000, as compared with 346 in 1911, valued at $980,000. As in 1911, Russia was the chief country of destination, shipments amounting to 502 tons, an increase of 298 tons over the previous year. Brazil was second, being credited with 394 tons, as compared with 149 in 1911. Consignments to Argentina about doubled, but were not large (56 tons in 1912). Trade with the United States decreased from 37 tons in 1911 to 31 in 1912, and with Great Britain from 92 to 48 tons.

Germany's imports of motor vehicles did not increase in the same proportion as her exports. In value they grew from $2,792,000 in 1911 to $3,432,000 in 1912, an increase of only 22 per cent., as compared with 56 per cent. in the case of exports. In number the increase was from 1,823 to 2,267.

The chief country of origin was France; the second Belgium, and the third the United States, credited with 324 tons, as compared with 55 in 1911. The only other large increase occurred in the case of Belgium, amounting to 154 tons, or 60 per cent. Importations from France remained about stationary, falling off slightly, and decreases occurred in the purchases from Great Britain, Austria-Hungary, and Switzerland.

The importation of motor trucks increased from 134 to 201 in number and from $390,000 to $607,000 in value. The only important countries of origin for motor trucks were France and Switzerland. Imports from France fell off slightly; those from Switzerland increased from 198 to 234 tons.

The returns of Germany's home trade in motor vehicles in 1912 are not yet in statistical form. A report recently issued by the Association of German Motor Vehicle Manufacturers, however, announces that great activity prevailed almost without exception. Manufacturers experienced difficulty in keeping

within the delivery time limits of their contracts in 1912, and it is claimed that purchases of automobiles abroad would not have increased even in the comparatively moderate measure which they did had it not been that many domestic consumers were forced into the foreign market in order to obtain deliveries at short periods.

The aggregate value of the vehicles produced in 1911, including extra parts and the value of repair work done during the year, is given at $37,300,000, as compared with $26,000,000 in 1910 and $17,300,000 in 1909. The aggregate value of the products of auxiliary and dependent industries in 1911 is estimated at $48,500,000.

On January 1, 1912, according to official statistics, 43,162 passenger automobiles and 6,687 motor trucks were in use in Germany. The use of motor vehicles in Germany is still comparatively limited.

German manufacturers see in this situation the promise of a rapidly expanding home demand. Considered in conjunction with the existing high commercial and industrial prosperity of the country, it is an invitation to foreign manufacturers to enter the field or to extend their existing German activities. The year 1912 was marked by a heightened interest on the part of American exporters. A large American firm opened a branch office and show room in Berlin, equipped with a complete supply of spare parts, placed over it an American manager, and provided him with a generous appropriation for advertising. Another well known American concern has maintained a similar branch in Berlin for some two years. A number of other American automobile manufacturers investigated the field in the course of 1912, and several have established agencies in Berlin and other centers. Considering these facts the increase in the number of automobiles imported into Germany from the United States during 1912 assumes added interest.

From the American point of view the most promising market appears to be for the low-priced car, as in the absence of the high standardization attained in the United States German manufacturers are not so well able to compete in this line. A local American business man, well versed in the automobile trade, expresses the opinion that there is also a market, although, of course, limited, for the highest priced American products—that is, cars selling at $5,000 and $6,000 and up. In the sale of the heavier motor trucks the government subsidy on these vehicles with a view to their use in war is an obstacle, though the market is by no means closed, as all operators do not find the government subsidy proposition a profitable one to accept.

In reviewing the conditions which are now affecting the sale of American automobiles in Germany, it is of value to note the important bearing which the automobile tax law has on the marketability of particular types of machines. By this law automobiles are taxed according to rated horsepower. The result has been that the construction of motors which actually develop high power but are still ratable under the legal formula at a low horsepower has been given great attention.

Needless to say American manufacturers can compete only under a great disadvantage unless they provide motors constructed with a view to this local condition.

ONE STEP TO PREVENT LUMBER MONOPOLY

In a sale of 50 million feet of national forest timber a contract has been entered into which, Forester Graves says, contains effective safeguards against possible monopoly. The timber is located on the Mount Graham division of the Crook national forest and flumes will be constructed for taking the lumber from the mountain into Gila valley. Under the terms of the sale these flumes, which will form an outlet from the Mount Graham range timber generally, are to be available for the use of the government or for any other purchasers from the government.

1913 SHOWS AND FAIRS

Following is a list of implement and vehicle shows and state and interstate fairs to be held during 1913:

Implement and Vehicle Shows

National Gas Engine Association Show, Kansas City, Mo., Aug. 16-23
National Implement and Vehicle Show, Peoria, Ill...Sept. 19-27
Tri-State Vehicle and Implement Dealers' Association Show, Louisville, Ky., Nov. 10-15
Iowa Implement Dealers' Association Show, Des Moines, Ia., Dec. 1-6
Wisconsin Retail Implement and Vehicle Dealers' Association Show, Milwaukee, Wis., Dec. 8-13

State and Interstate Fairs

Alabama (state), Birmingham.....Oct. 9-18
California (state), Sacramento.....Sept. 13-20
Colorado (state), Pueblo.....Sept. 15-20
Connecticut (state), Hartford.....Sept. 1-5
Georgia (state), Macon.....Oct. 21-31
Idaho (Lewiston-Clarkston), Lewiston.....Sept. 29-Oct. 4
Illnois (state), Springfield.....Oct. 3-11
Indiana (state), Indianapolis.....Sept. 8-12
Iowa (state), Des Moines.....Aug. 20-28
Iowa (interstate), Sioux City.....Sept. 15-19
Kansas (state), Hutchinson.....Sept. 13-21
Kansas (state exposition), Topeka.....Sept. 8-12
Kentucky (state), Louisville.....Sept. 15-20
Kentucky (Blue Grass), Lexington.....Aug. 11-16
Louisiana (state), Shreveport.....Nov. 5-12
Maine (eastern), Bangor.....Aug. 26-29
Maine (state), Lewiston.....Sept. 1-4
Maine (central), Waterville.....Sept. 9-12
Maryland (state), Timonium.....Sept. 2-6
Maryland (interstate), Hagerstown.....Oct. 14-17
Massachusetts (New England), Worcester.....Sept. 1-4
Michigan (state), Detroit.....Sept. 15-20
Michigan (West Mich.), Grand Rapids.....Sept. 1-6
Minnesota (state), Hamline.....Sept. 1-6
Missouri (state), Sedalia.....Sept. 27-Oct. 3
Mississippi (state), Jackson.....Oct. 28-Nov. 7
Montana (state), Helena.....Sept. 22-27
Nebraska (state), Lincoln.....Sept. 1-5
New Jersey (interstate), Trenton.....Sept. 29-Oct. 3
New York (state), Syracuse.....Sept. 8-13
North Carolina (state), Raleigh.....Oct. 20-25
North Dakota (state), Grand Forks.....July 22-26
Ohio (state), Columbus.....Sept. 1-5
Oklahoma (state), Oklahoma.....Sept. 23-Oct. 4
Oregon (state), Salem.....Sept. 29-Oct. 4
Pennsylvania, Allentown.....Sept. 23-26
Pennsylvania (Grangers' picnic), Williams' Grove....Aug. 25-30
South Carolina (State), Columbia.....Oct. 27-Nov. 1
South Dakota (state), Huron.....Sept. 6-12
Tennessee (state), Nashville.....Sept. 29-Oct. 4
Tennessee (tri-state), Memphis.....Sept. 22-27
Texas (state), Dallas.....Oct. 18-Nov. 2
Utah (state), Salt Lake City.....Sept. 29-Oct. 4
Vermont (state), White River Junction.....Sept. 16-19
Virginia (state), Richmond.....Oct. 6-11
Washington (state), North Yakima.....Sept. 29-Oct. 4
Washington (interstate), Spokane.....Sept. 15-21
West Virginia (state), Wheeling.....Sept. 8-12
Wisconsin (state), Milwaukee.....Sept. 8-12
Wyoming (state), Douglas.....Sept. 30-Oct. 3

Canadian Fairs

Canadian Industrial, Winnipeg.....July 8-16
Canadian National, Toronto.....Aug. 23-Sept. 8
Calgary Industrial, Calgary.....June 30-July 5
Central Canada, Ottawa.....Sept. 5-13
Quebec Provincial, Quebec.....Aug. 23-Sept. 2

DESCRIPTIVE OF RUBBER AND RUBBER TIRES

By J. Traxler, of Goodyear Tire and Rubber Co.

Centuries ago, long before the discovery of America by Columbus, rubber or caoutchouc was known to the South American Indian. As far back as 1500, Pincon, the Spanish explorer, told of these Indians of the dense forests bordering the banks of the great Amazon, who tapped the caoutchouc trees, and extracted a milky fluid. He did not explain its use. Columbus noticed natives playing ball with a curious substance grown in the primeval forests and prepared according to native ways. Little did the Spanish explorer of the sixteenth century dream what an important part those immense forests were to play in twentieth century commercialism.

In 1770 Priestly, an Englishman, found that this milky white fluid, when hardened, could be used in effacing pencil marks, and in the early part of the nineteenth century Hancock discovered that caoutchouc could be used in the manufacture of articles of dress. A few years later Charles Mackintosh, a Scotchman, rendered two fabrics waterproof by uniting them with a solution of rubber in coal naphtha, hence the name "mackintosh" for the waterproof coat.

Not until about 1839, however, 16 years later than the advent of the mackintosh, did Charles Goodyear, an American, discover the method of vulcanization, and make rubber fit to take its place among the most important commercial products of the world.

The recent increase of rubber-tired vehicles, and the introduction and the development of the automobile for pleasure and the motor truck for commercial use, have increased enormously the market for crude rubber.

In 1898 the price of crude rubber, owing to the demand created, suddenly advanced. Some years before it had been foreseen that possibly the supply of South American gum would run out, and, through the efforts of American and English planters, seeds were shipped to almost every tropical climate, and cultivated rubber trees were grown with success. The best rubber, however, still grows wild in the forests on the Amazon, and, according to F. A. Sieberling, president of the Goodyear Tire and Rubber Co., Akron, O., who made an extended trip down the Amazon two years ago, the supply will more than equal the demand for some years to come. In the meantime, rubber plantations are springing up in many tropical countries. Some of these are already large producers of high grade gum, and the future of the supply of raw materials seems to be assured.

Rubber-producing trees, shrubs, etc., are found mostly in northern South America, Central America, Mexico, Central Africa, and Borneo.

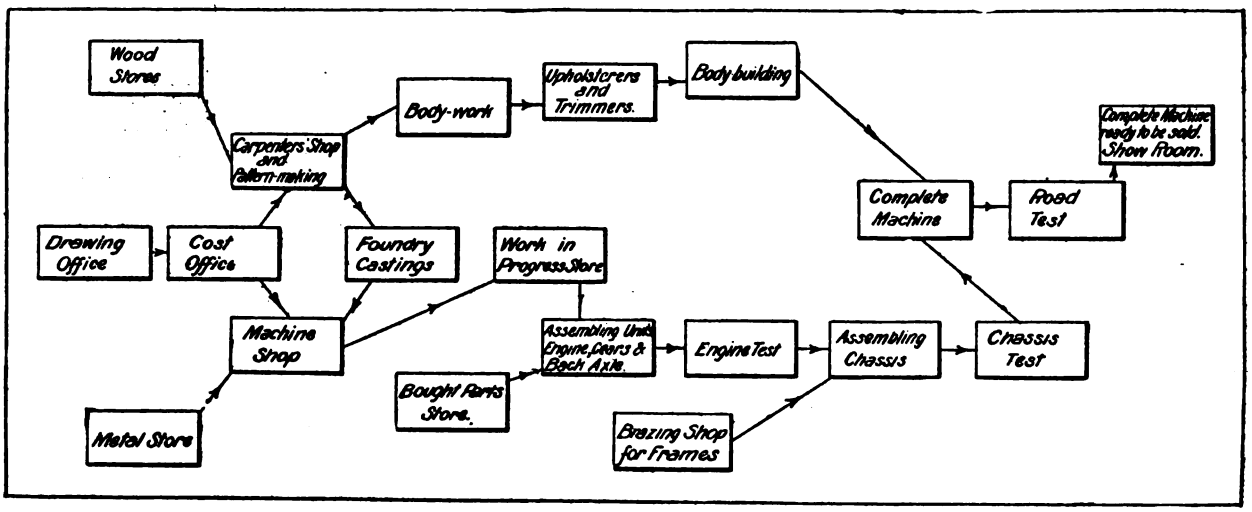
The finest rubber obtained is fine Para, gathered in the Amazon regions of South America. Selecting a rubber tree, the natives cut V-shaped grooves in the bark with a special knife made for the purpose, these grooves being cut in herring-bone fashion diagonally around the tree, with one main groove cut vertically down the center like the main vein in a leaf. The latex of the tree, from which the rubber is taken, flows from these veins and down the center vein into a little cup at the bottom of the main vein. When the cups are filled they are gathered, and brought into the rubber camp, and there the latex is coagulated by means of smoke. This is done by the use of a paddle, which is alternately dipped into a bowl of the latex and then revolved in the smoke from a wood or palm-nut fire. This smoke seems to have a preservative effect on the rubber as well as drying it out and causing it to harden on the paddle, each successive layer of the latex causing the size of the rubber ball or biscuit to increase. When a biscuit of sufficient size has been thus coagulated, it is removed from the paddle and is ready for shipment to various countries where rubber products are manufactured.

Crude rubber as it is received at the factory is more or less dirty. Sand, leaves and twigs sometimes constitute as high as 40 or 50 per cent. of the weight.

These foreign substances are removed by washing the gum; one or two tons being soaked in warm water and then taken to a machine called a "cracker." The cracker consists of two large rollers, covered with pyramidial projections, which revolve very closely together at different surface speeds. It is a powerful machine, and as the gum is fed between the rolls the projections tear it to pieces. During this process a continual flow of water from perforated pipes plays upon the rubber, and as it goes through these rolls repeatedly the water gradually washes away most of the foreign substances.

After this the gum is shovelled into boxes and taken to what is known as a "washer." This also consists of rolls, but the projections are relatively small and the rolls are nearer together. The work of removing the foreign matter is completed here, and in addition the gum is "sheeted out." Sheeting is accomplished by using warm water as the washing finishes. The heat is just enough to make the gum sticky, so that from 15 to 25 pounds of rubber a sheet 18 in. wide, several feet long, and 3/16 in. thick results. These sheets are then dried for from three to four weeks.

Mixing the crude rubber with the compounding ingredients is the next step. Each of the constituents of a 100 pound "batch" is carefully weighed and taken to the milling room. Here the rubber is warmed and softened before the compound is added, by passing it between the warm rolls of a machine similar in design to the washer, but much larger and with highly polished rolls. The front roll revolves more slowly than



A diagram of the excellent and well-organized scheme for factory organization. The work is all the time progressing in one direction, towards the showroom.

the back one, and the gum soon forms an envelope around this. The compound is sprinkled on the gum, a little at a time, and is gradually worked in by the constant kneading effect of the rolls on the softened gum. Finally, the rolls are opened a little and the stock cut away in slabs about half an inch thick.

Once again it is allowed to rest—this time 48 hours—when it is ready to be shaped for the rolls. In making solid tires, where the length is many times the other dimensions, it is necessary to make use of another machine. This is done by running through what is known as a tubing machine. This resembles a meat chopper on a large scale, with a die opening in place of the small holes. This turns out a continuous length of rubber of proper cross section as long as the milled stock is fed in.

Then follows the weighing of each tire, cementing to the base band, laying in the mould, solting the mould, and placing the whole in a boiler heater.

The length of time required to "cure" or "vulcanize" a tire of medium size is about three hours. Taken from the heater it is cooled, removed from the mould, trimmed of the rinds at the line of contact of the halves of the mould, and the tire is ready for shipment.

Tire manufacturers have had to be chemists, inventors, analysts, and keen observers of conditions as well as mere craftsmen. They have had to establish their own precedents, to solve problems of construction and service that men have never faced before. It is a long step from the Amazon jungle, where natives slash trees and gather the sap, with chattering monkeys and brilliant parrots as an audience, to the sturdy, rumbling truck that is revolutionizing traffic in the cities of the world.

MEETING OF MICHIGAN HARDWOOD MANUFACTURERS

At the annual spring meeting of the Michigan Hardwood Manufacturers' Association, held at the Hotel Ponchartrain, Detroit, on Friday, April 25, an attendance of about two-thirds of the entire membership was present. Forest fire protective work; the continuance of the Michigan association as a member of the National Lumber Manufacturers' Association; liability insurance, and market conditions, were among the matters considered.

Secretary J. C. Knox, Cadillac, in his report, referred to the conditions for the coming year in Michigan hardwoods and hemlock. He said that to a degree exceeding any previous year the manufacturers had contracted their season's cut and at prices above anything ever before realized. A greater demand is shown for hardwoods and hemlock than the supply warrants, and the cut for the year as estimated on April 1 was indicative of quite a substantial decrease in production.

He recommended that lumbermen keep in touch with the action of the railroads regarding milling in transit, which is now being considered by the Interstate Commerce Commission. He urged the manufacturers to keep posted on freight rate matters, as the railroads were proposing to change not only commodity but class rates in many items, and he believed that there should be a special effort made to see that they were not materially disturbed. Mr. Knox called attention to the fact that the employers' liability law was in danger of amendment, but was of the opinion that the present law had not been given sufficient time to be worked out, and, therefore, believed that the legislature might allow the law to pass unamended at this session. Like similar enactments in several other states, the Michigan law is necessarily somewhat of an experiment.

The treasurer's report, as read by Secretary Knox, showed a balance of $6,858.15 on April 15. Relative to the forest fire work, he said that while there was a balance of over $1,600 in the fund, an assessment would probably be levied to carry on the work for the coming season. The hardwood manufacturers are interested in any measures that reduce the loss by forest fires.

EXPORT TRADE SHACKLES

H. M. Kahler, in American Industries, has his say on "Self-Imposed Shackles" put on by the American manufacturer who is looking for foreign business. It is so much to the point that we give it unusual space. It should be read with care.

Anyone whose acquaintance with the ways and means of foreign business extends well beyond the confines of a single line or concern can mention many instances in which a highly promising and profitable field is sacrificed to a blind faith in established domestic precedents—in which export possibilities are neglected in order that certain utterly futile "rules" or "policies" may not be altered. More than one such observer has stated the belief that these self-imposed shackles do more to the detriment of our aggregate export than any other single influence, and there is plenty of sound argument in support of such a view.

To analyze the correspondence of many presumably intelligent firms with their prospect export connections, is to adopt, unwillingly, the conclusion that the manufacturer wants to make it as hard as possible for the agent to accept his proposals. Stipulations which have nothing whatever to do with the actual situation are allowed to intrude upon a discussion of terms and conditions; matters which cannot conceivably arise in the course of real business relations are toilsomely threshed out in advance of any business arrangement; and the actual beginnings of trade are often delayed or abandoned because of a radically mistaken desire to adhere to totally unimportant principles.

For example, nine motor car makers out of ten insist that their prospect agent in Guatemala or Uruguay must place an order for a "sample" car at the full price which he is to pay for vehicles subsequently ordered for resale. This practice is all very well here at home, where our easy communication, our excellent facilities for getting acquainted over long distances, and our huge market for cars, combine to make the matter one of decidedly minor importance to the prospective agent, who is usually ready to order a good many more than one car, to begin with, and therefore does not need to quarrel over this trifling consideration. He has seen the car before he buys, or he has had such experience with the manufacturer's previous models that he is justified in taking its merit on faith, or the manufacturer has a reputation which solves the difficulty.

But it is decidely different with the foreigner—who has never seen anything more convincing than a catalog, whose knowledge of the manufacturer and his line is confined to hearsay of a prejudiced type, and whose market for American motors is far less extensive and responsive than is the case here, where the meanest maker gives his dealers the benefit of a good deal of national advertising, beside more or less local support. The foreigner who solicits an automobile agency is treated on almost precisely the same basis—or, if there is a variation it is not in his favor—as the American whose situation is a hundred-fold safer. And right here is one excellent reason why so pitifully many motor car people fall flat on their foreign trade, notwithstanding the fact that if the situation were rightly handled almost every factor in it would favor them.

The foreign agent ought to have some inducement to buy and pay for that first car—he ought to get it at an extremely special price, not because he is the agent, but because it is worth real money to have a demonstrating car at work, because in putting up his money and investing his time he is performing a highly essential and highly valuable service to the maker—a service without which actual sales would be something a little less marvelous than miracles. This "sample" car ought to be regarded and handled as a sample—that is, as something special, something outside of the regular routine of purchase and sale.

Time and again I have seen month after month used up in footless argument over this matter which could have been turned to splendid account in the actual sale of cars on a business basis if the American house could have realized the justice of the foreigner's point of view. Time after time I

have watched splendid agency connections slip away from the firms to which their natural inclinations made them favorable and take up work for makers whose goods were far less salable, simply because the manufacturers first approached persisted in regarding any attempt at a mutually equitable "sample" purchase as a flimsy attempt to get a car below the usual terms.

The habit of giving an agency to any house of apparent solidity which manifests a willingness to accept the stiff terms commonly set in this line is just as bad as the habit of refusing it to those who justly quarrel with the terms. I recall one case in which an undertaker in an interior city of Argentina secured the agency for Buenos Aires and Montevideo, along with the rest of both Uruguay and Argentina, simply because he paid cash for his first car and agreed to every stipulation the manufacturer laid down. He wanted one car—it was a low-priced one—for his own use. He got it at the agent's price, and ceased worrying at once. When the manufacturer wrote him about his failure to order his specified shipments, he ignored the correspondence, and it was only after eleven months of annoying inquiry that the agency was finally taken from him. Having had experience with one sample hunter the manufacturer was so gun-shy that he veered to the opposite extreme, and, after interesting a splendid firm in Buenos Aires, he insisted so rigidly on impossibly hard conditions that after six months of squabbling the deal fell through.

These are perhaps extreme cases, but the condition which they indicate is decidedly general—not only in the motor trade but in many other lines in which the individual purchase must involve a relatively heavy outlay on the part of the agent. The known existence of petty sharpers, on the lookout for expensive merchandise at agency rates without any trace of title to such concessions, is allowed to influence the whole attitude of the manufacturer so that legitimately interested agents, honestly anxious to secure samples so as to begin making sales, are brow-beaten and insulted, and, at best, are hampered heavily in their initial undertakings.

Admitting that actual sampling is out of the question on lines of high cost and of such nature that the dealer can use them in his personal capacity; admitting, too, that many sample hunters and not a few sample hunting dealers are always ready to sting the unwary manufacturer, I submit that it is good business to make the process of equipping the agent with his essential demonstrating outfit as simple and painless as possible. Suppose that an occasional dealer does make use of the opening to secure an article for his personal use at less than the trade prices, suppose now and again the manufacturer is imposed upon, does this involve any terrible loss, so long as the price exacted for the "sample" covers most or all of the manufacturing and shipping costs? If so, does the loss compare in importance with the negative losses caused by failure to close up agencies otherwise obtainable, and the delay in closing those which finally accept the terms? Lost time, lost opportunities, lost business are all irretrievable. Lost money and lost goods can be replaced. And most of our present American losses so far as export is concerned, unquestionably fall into the less perceptible but far less retrievable class of lost opportunities.

It is very easy to allow unfamiliarity with certain foreign markets to exercise a strongly unfavorable effect upon otherwise intelligent sales effort, through failure to employ the most effective argument or through emphasis upon an unimportant one. And even very successful exporting manufacturers are quite frequently guilty of both practices, one being about as common and about as damaging as the other.

Instances can be introduced almost indefintely to show the folly of this procedure. The foreign buyer in the great majority of cases is vitally interested in the point of quality in one direction or another. He knows that added costs will bring up the outlay to him on any particular purchase to a figure well above the manufacturer's selling price, and that these additional expenses are almost as great on an article of inferior quality as upon the very best goods obtainable. He is therefore particularly susceptible to selling argument based upon durability, service, lightness, strength, style, taste, comfort, or whatever the especial merit of the article may be, and the price he is required to pay is considered rather in relation to the amount of merit it will buy, than as an individual factor in the case. Time after time the maker of a high-priced line sacrifices the essential advantage which such goods offer to the exporter by trying to conceal, excuse or justify his price, instead of bragging about it as one of his selling arguments. In one case a firm making an unusually excellent article, selling at the highest price quoted on goods in its line, had made a signal failure of its export effort, and was convinced that the foreign buyer wanted nothing but cheap goods, until it was persuaded to make an experiment with its high price featured as among its chief selling merits. Instead of the failure which was expected, this concern speedily found an excellent demand for its product in the territory where previous attempts had been most disastrous. The buyer was favorably influenced by the fact that this firm's prices were so high that nothing but the possession of exceptional merit could conceivably justify them, and cautious experiments proving to early converts that this degree of merit actually was to be found in the goods in question, the rest was a mere matter of course.

ELECTRIC AUTOMOBILE MARKET IN SICILY

Six electric automobiles are registered at Palermo, all of the closed coupe type. They are of the Italian makes, Fram and Ansonia, and average 35 to 45 horsepower. Of these cars, which are equipped with storage batteries, only two are said to be in running order.

In the opinion of the principal dealer in Palermo, there is a good field for American electric automobiles in that city, provided the sale is pushed with energy, but it is not likely that an electric automobile will be preferred to a gasoline car, as the latter is much cheaper in price. There are no charging stations in the city, but it is understood that storage batteries can be charged at the electric-power stations. The two plants for the production and distribution of electric energy, one aggregating 260 horsepower and the other 4,650 horsepower, produce (1) direct current of 2 by 150 volts for public and private lighting, (2) direct current of 600 volts for the electric street cars, and (3) alternating single-phase current of 5,000 volts, 50 periods per second, for lighting the suburbs after transforming to 150 volts.

The price of current sold to consumers, including the government and municipal tax, is 8.2 centimes (1.58 cents) per hectowatt hour, and of current for electric motors 3 centimes (0.57 cent) per hectowatt hour. There are no special garages for electric automobiles, and the owners of cars have found it very difficult to secure skilled electricians to do repair work.

Reports from the other consular officers in Italy indicated that conditions were not promising for the sale of electric automobiles in that country.

RELIGION STORMS THE STUDEBAKERS

The Marion (Ind.) Chronicle's South Bend correspondent reports that 300 men owe their conversion to Christ to the great Studebaker wagon works and Billy Sunday, the baseball evangelist, who has been shaking the city from center to circumference for the past three weeks. At the conclusion of a stirring service led by the ex-baseball player, J. M. Studebaker, the last survivor of the five famous brothers, leaped from his seat and with a voice filled with emotion cried:

"This is an opportunity for us all, men; this is a call from God."

"Come on, boys," shouted Clement Studebaker, a nephew, and started to the front following his aged uncle, and followed by other members of the Studebaker family. Instantly 300 men, employes of the great wagon works, stampeded to the front from every part of the vast audience.

JUST FIND THIS ADVERTISING "MANAGER"

I want a man answering the description of Goldsmith's school master—you will remember the lines:

"They wondered much, and still the wonder grew,
That one small head should carry all he knew."

No ordinary individual is capable of filling the post. The man I want must possess certain qualities—he should possess others.

He must be a well-read, well-educated man, a keen judge of human nature, able to form correct estimates of what the public will or will not accept; for you must bear in mind that the public do not take kindly to everything even that's good.

He must be tactful and diplomatic, with a ready ear for suggestions. He must know how to turn down the unpractical suggestion in such a way that the fount of suggestions may not be dried up. The fellow who can find poor suggestions today is generally a "trier," and by the process of progress and evolution, later suggestions may be brilliant ones. He must not be egotistical. He of all men must realize that there are other brains as keen as, or keener than his at work, and he must be prepared to rise to a point from which he can successfully compete in the battle of enterprise and originality.

He must have made mistakes—for the man who has not made mistakes has generally got them yet to make—but, on the other hand, he must have realized the truth that he who makes the same mistake twice is a fool; he who makes it a third time is himself one of life's biggest mistakes, and his employer's misfortune.

He should possess a strong vein of originality; he should be of an artistic temperament, able to see the "pretty" side of things. He should be a strong man, one not too easily moved from a view which he believes to be sound and practical; and he should be tolerant—that is to say, he should endeavor to see all who call upon matters relative to advertising, as without some such method he will certainly miss the occasional bit of wheat which is found in the chaff presented in the ordinary way by the ordinary advertising canvasser.

Having described the man—and I am not at all sure that I have embodied the whole list of requirements—I am now in a position to tell him what I shall expect from him.

The advertising manager, if he is to run a successful department, must know all about the goods he has to find markets for, their weak points as well as their strong ones. He must know a good deal of the inner side of the manufacturing process; in short, his position is to a great extent "confidential." Therefore, I look for loyalty not only to me personally, but to the goods, the system, the management, and to everything and everybody about the establishment.

He must also be on the lookout for new fields to conquer. He will find in his own territory capacity for extension and improvement, and he will sometimes find foreign campaigns alluring; but his watchfulness must be controlled by sound and matured judgment, for it is when undertaking any real departure from the ordinary campaign of the business with which he is associated that judgment, and sound judgment, is essential.

COLUMBUS BUGGY CO. IMPOSED UPON

An imposter who has extended his operations in almost every section of the country within the last two months, caused receivers for the Columbus Buggy Co. no end of annoyance and embarrassment. Nearly a hundred letters have poured in on the receivers from hotel keepers, asking for information regarding the man. Three different names have been used, C. H. Evans, C. N. Barnhard and C. N. Bourne. The letters extend from New Milford, Conn., to Monroe City, Mo.

The plea of the imposter is that he has not received his salary check from the company and that he is looking for it at the next town. On his promise to send the money back when he receives his remittance he has usually succeeded in getting his room and board and a loan of a few dollars.

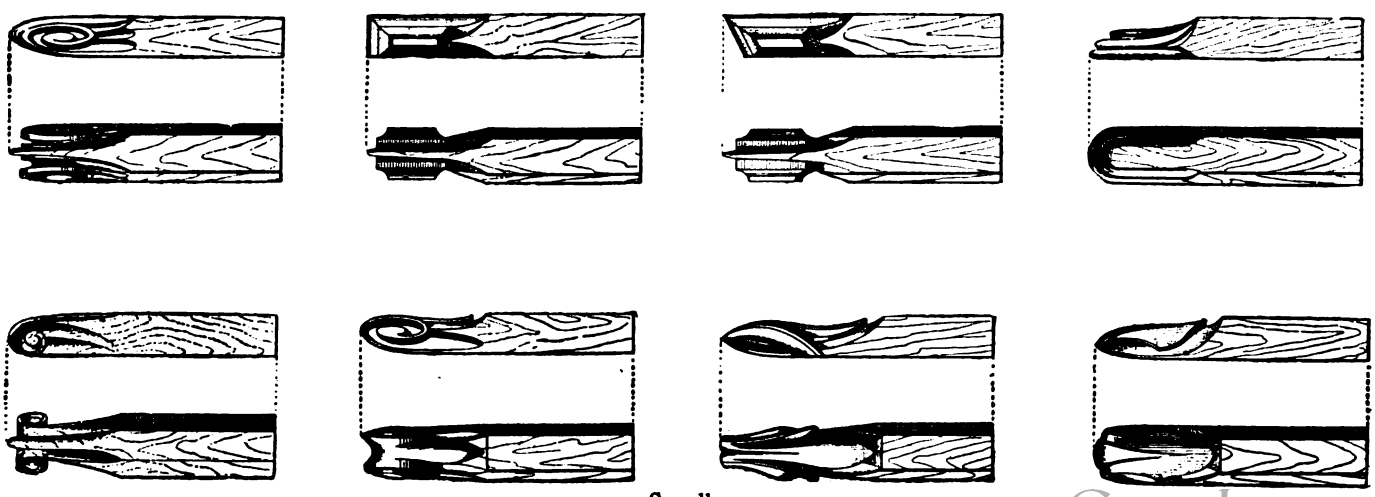
Letters received indicate that a smooth operator is working. It is said he also travels with a woman. He has in his possession cards printed with the name of the company on them and a cut of a buggy. His name is written in ink on the cards.

O. H. Perry, of the company, said that the company would prosecute the imposter and has notified the victims that they had been defrauded and to have him arrested when seen. He is described as a stout man, middle aged and very talkative. His operations are said to have netted him hundreds of dollars.

PHILADELPHIANS WANT TECHNICAL SCHOOL

At the regular monthly meeting of the Carriage, Wagon and Motor Vehicle Association of Philadelphia, held at the Hotel Hanover, Twelfth and Arch streets, on Friday, May 16, a paper on "The Establishment of a Drafting School in Philadelphia," prepared by the editor of The Carriage Monthly, was read by Secretary Keachline, outlining a plan for the co-operation of the vehicle trade of Philadelphia with one of the established mechanics' institutes of the city. Many of the members spoke in favor of the school as suggested. The president appointed Messrs. Marbaker, Keachline and Cardwell a committee to make further investigations and report at the September meeting.

The annual excursion of the association this year will be to Wildwood as that was the unanimous expression. The usual banquet following the meeting was enjoyed in the dining room of the hotel.



Scrolls

Paint Shop

SPIRITS OF TURPENTINE

In view of the rapid disappearance of our once great forests of hard or yellow pine, forests from which we for so many years milked the fragrant sap that supplied us with spirits of turpentine, it is now necessary for us to either find some other supplies of sap pine or invent a perfect substitute for turpentine spirits, says A. A. Kelly, in Wood Craft.

As to substitutes, that is easy enough for the present and immediate future, or as long as our pine stumps and other refuse from the pine lands hold out; and we have also petroleum oil to help us out, for from that source they are now getting a very fair substitute for turpentine spirits. I had some samples of this petroleum spirits sent me from the manufacturers, and it has an odor so nearly like the real gum or wood turpentine that still I do not believe it came from rock oil. Yet I am assured that it did.

They have improved the method for taking the sap from the pine tree. Much more sap is obtained and the tree has a longer lease of life. Down near the roots, about ten inches from the ground, little cup-like boxes are chiseled out, and into these the sap runs. Now and then the edges of the boxes, as they are known, are freely chiseled in order to induce the flow of the sap.

Four or more boxes are made in a tree, according to the size of the tree, and each box holds about one quart. It takes about three weeks for a box to become full, and in about one year 1,000 of the boxes will yield from 18 to 24 barrels of sap. That would be some 250 trees. After recutting the boxes several times they will become so large that it is impossible to enlarge them any more, so that a new series of boxes is cut farther up the trunk, or above the first ones, and in this way the series of boxes are continued until the top ones will reach some 15 feet above the earth.

The life of such trees, after the first tappings are made, is about fifteen years. The sap or gum obtained the first year is very clear, or nearly white, but the color becomes darker with each year, until of a beautiful deep red. But no matter what the color, or how many or how few the years of tapping, the product is in all cases the same, and color makes no difference in the price obtained. The trees are tapped during the spring and winter months, beginning as early as October in the fall.

Turpentine spirits made from wood refuse, such as sawdust, pine stumps and slabs, have been very thoroughly tested by M. P. Vietch, chief chemist of the U. S. Department of Agriculture, who says that if it is sufficiently refined it is chemically equal to pure gum spirits of turpentine, no deleterious ingredients existing. In one of his tests kauri-gum was cut with pure wood turpentine, making an ordinary varnish. This he sent to the finishing room of one of the largest houses in the country. It was to be applied to a panel. At the same time they were to varnish some other panels with the varnish they had been employing in their regular work, but using only the very best. After the lapse of two years it was found impossible to determine which was which, as to appearances, and the varnishers admitted that the wood turpentine varnish equaled the gum turpentine varnish in every respect saving that of odor. The odor, by the way, is the one difficulty that so far has not been overcome.

But wood turpentine is slower in drying by about one-half the time, according to some experiments, and this is an important matter in a varnish. Driers may be added to hasten the drying process, but this again would be bad for the varnish, as it is from excess of driers that pitting, etc., come. In a word, it may be said that the difference between wood and gum turpentine is about as great as the difference between wood and grain alcohol. Yet the two turpentine spirits, the two obtained from the dead and live wood, are very closely related, being very nearly alike in composition, though differing considerably in regard to certain physical properties. The specific gravity of both is identical. The flash point, too, is quite similar, there being only two degrees difference.

The real practical difference between the two turpentines is found in their rate of evaporation, and this is important in connection with the flowing and leveling of varnish. Here is a very interesting table showing the rates of evaporation of several liquids, the rate being per hour, per square inch, for a given volume of fluid.

	Per cent. by Weight.
Water	0.61
Grain alcohol	5.10
Wood alcohol	9.74
Turpentine	1.10
Wood spirit	1.58
Benzine	4.70
Gasoline, 87 degrees	55.11

Wood turpentine cannot be called a substitute, it is turpentine. What we know as substitutes are mainly hydrocarbon fluids which do not combine with linseed oil and paint to form a permanent mixture, and hence may be said to be detrimental to paint. The following formulas will give a fair idea of what these substitutes may be:

Two parts genuine turpentine, 1 part rosin spirit, and 1 part heavy benzoline.

One part turpentine, 1 part coal tar naphtha, 2 parts petroleum spirit.

Equal parts turpentine, rosin spirit, petroleum spirit, and coal tar naphtha.

One gallon turpentine, 1 gallon rosin spirit, 2 gallons petroleum spirit, 2 pounds rosin, 2 pounds gum sandarac.

One gallon rosin spirit, 1 gallon coal tar naphtha, 1 gallon shale naphtha, 1 gallon turpentine, 3 pounds rosin, and 1 pound gum sandarac.

From the standpoint of the chemist there is no real substitute for gum turpentine spirits. At any rate there does not seem to be a satisfactory substitute in sight. One of the troubles with these substitutes is that no two are alike. If they were all alike one might in time learn how to use them to the best advantage, just as we use turpentine. A substitute with a petroleum base ought to be a very cheap article, yet we know that a rather high price is asked for them, based, of course, upon the selling price of the pure turpentine, the maker of the one article keeping close to the latter's price, knowing that the buyer must have either.

These substitutes are made from the petroleum that comes from Borneo and Sumatra, from the Caucasus and the borders of the Black Sea. These oils do not make good illuminating oils, whereas the American oil does, at least the oil from Pennsylvania and the other states supplying the Standard Oil Co. with the fluid. The latter fluid would not make good turpentine substitutes, being too light. A very few years ago the market was being exploited with so-called Russian turpentines, with others of like foreign names, but these turpentine substitutes were very greasy and did not evaporate well, some indeed not completely evaporating at all.

Benzine is often used for thinning paint and varnish in place of the costlier turpentine. It is very satisfactory to a certain

extent. It thins out very well, and allows of thin spreading without weakening the base it is mixed with. That is, it evaporates completely and rapidly and leaves all the paint or varnish behind unaltered. It does not injure the linseed oil, neither does it dry it or help in drying it, as turpentine does. It is entirely too quick for good work. Yet withal it is a better substitute or makeshift than the so-called petroleum substitutes. Gasoline is still quicker than benzine, and not at all fit for paint or varnish thinning.

What across the water is known as oil of turpentine we call spirits of turpentine, or "turps" for short. Turpentine, properly speaking, is the gum, which being distilled gives the spirits. The distinctive value of this turpentine spirits lies in the fact that it thins out a varnish or paint, evaporates slowly, and assists in oxidizing the oil, by taking up oxygen from the air and releasing it to the oil similar to the action of driers.

Benzine will thin and apparently flat or deaden the lustre of the paint. It quickly evaporates. After it has gone a sort of lustre remains to the paint, thus giving a surface that is neither flat nor lustrous. On the other hand, it is better than turpentine for thinning out enamel paint on interior work. It thins the enamel paint enough to make its application easy without impairing the gloss which turpentine certainly would injure. But benzine will yellow white paint while turpentine tends to keep the paint white.

New turpentine is thought to be less useful in paint than that which has aged a little, but at the same time we know that old turpentine, which is partially oxidized, will not dry right, but will give a sticky surface with paint or varnish. The trouble with quite new turpentine seems to be that it contains some pyroligneous acid, a substance very injurious in paint or varnish. But if the turpentine is allowed the proper time for settling, this acid because of its greater specific gravity will fall to the bottom, and so leave the turpentine pure and free.

The U. S. Department of Agriculture issued a bulletin containing elaborate directions for testing turpentines, which the reader may obtain from the department at Washington, if sufficiently interested; for us it is too technical, but of great value, I imagine, to the chemist. But there are some simple ways for testing turpentines that any painter or varnisher may employ.

First, pure gum spirits of turpentine is quite white, water-white as the liquid is known in commerce, because having no appreciable color. It has, too, a pungent and aromatic odor quite unlike any other fluid. Wood turpentine smells like it, but is much stronger smelling of tar or rank pine wood, though the wood turpentine distilled by steam is much less offensive and more nearly like the pure spirits in odor. Gum spirits also has a sort of camphory odor, unlike anything in wood turpentine. When you pour out pure gum turpentine it will not foam. Pour a little of it on a sheet of white paper, let it remain a few moments, and after it has evaporated there will be no stain remaining to show where it had been. But if any adulterant is present there will be more or less discoloration, owing to the presence of oil. Place a small quantity of pure gum turpentine in a saucer and let it stand until it evaporates, and apparently nothing will remain. There will be something, a residue so small as hardly to be recognized. This is due to the presence of more or less foreign matter, which went over in the process of distillation. Absolutely pure gum turpentine would evaporate, therefore, and leave no residue whatever. To show how very small the amount of this residue is, notice its action on white paper, where it apparently leaves not a trace behind. But a smaller amount of residue would not necessarily indicate a pure article, as the addition of benzine would reduce the proportion of residue. The government allows 2 per cent. of residue.

Dr. Stiefel tested samples of turpentine which were labeled pure, and an equal number of samples of turpentine substitutes, and placed an ounce of each in an air bath, and heated them up to 110 degrees Fahr. for 41 days. The pure turpentine left a slight yellow film on the sides of the glass, while the substitutes gave a black residue; two of the latter samples failed to dry, but left appreciable quantities of oil.

Equal quantities of the turpentine to be tested and aniline oil of a red color are placed in a test-tube and well mixed by shaking, then they are stood aside. If in five minutes the mixture is not complete and uniform, but shows two distinct layers, you may be sure that some form of petroleum oil is present.

Pure gum turpentine boils at 308 degrees Fahr., while substitute turpentines begin to distill at 250 degrees.

W. G. Scott gives the following test for pure American turpentine: In a test-tube, size 6 by ⅝ inches, place about 10 cc. of the turpentine to be tested, then add about 10 cc. of the C. P. sulphurous acid (not sulphuric acid), and shake well until the two liquids are mixed. Set aside for 20 to 30 minutes to allow to separate, then observe the color and appearance of the two strata. Separation takes place very slowly. The upper stratum will be opaque, milky white; the lower stratum will be translucent, milky white. The odor will be a slight turpene smell. This is the action a pure American turpentine will show.

Any one of the methods given here for trying turpentine is very simple and quite within the means or ability of the average user of turpentine. Laboratory tests are very tedious, slow, and entirely too technical for the lay mind, and yet absolutely essential to any true determination of the character or quality of any solid or liquid used in the industrial arts. All large manufacturing concerns employ a staff of analytical chemists, who test all goods used by the concern, and in this way secure what they pay for and what they require, the expenses of the laboratory being more than met by the savings effected therein in the purchase of goods. To a certain extent any minor manufacturing concern should test all samples of goods offered for its use. It is the only way to be sure of getting what is ordered.

Turpentine is easily damaged by being placed in dirty containers. For this reason it is best to keep it in a perfectly clean tin or glass vessel, if of small quantity, yet how many will pour it into an empty oil or varnish can? Then the can should be tightly stoppered, access of air will result in its oxidation, making it what we call "fatty" or old. I am led to think that a turpentine of this kind has very little value. It is a good plan when not a great deal is to be used on a job, to have it in a bottle and keep it corked.

PREPARING GLUE BATCHES

Glues vary in water taking capacity, some taking more water than others, the range of difference being more than 100 per cent., that is, the best glue will take somewhat more than double the quantity of water possible to use with the poorest glue—if we prepare both of them in such way that the glue liquid prepared from the low grade glue has the same body thickness as the liquid prepared from the high grade glue.

This water taking capacity can be expressed in various ways, of which these two are the must useful:

That means as the amount of glue plus the amount of water required to make up a batch of 100 pounds of liquid glue; for instance, 40 pounds of glue plus 60 pounds of water, to make 100 pounds of glue liquid. As it is self-evident that water is required to dissolve glue, we never mention that part of the glue mixture, and as 100 weight units is such a convenient quantity to figure with, we abbreviate the lengthy statement of: "40 pounds of glue plus 60 pounds of water to make 100 pounds of glue liquid"—and say 40 per cent. of glue, meaning that 40 pounds of dry glue is required for every hundred pound batch of glue liquid, and that the rest of the batch is the water. The figure mentioned is then the percentage figure, for the glue. The water figure is ignored; but as the batch is always 100 where we quote the percentage figure, we have also the

water figure when we mention the glue figure—by deducting the glue figure from 100, in this case 100—40=60.

The advantage of using the percentage figure for cost estimates is obvious. If the percentage required is, say, 42 and the glue costs 12 cents a pound, we find the cost for a 100 pound batch by multiplying 12c×42=$5.04; or cost per pound of liquid glue is 5 4/100 cents.

Instead of referring to a batch of 100 pounds of the made up glue, where the sum of the two ingredients glue and water make the hundred pounds, we can also speak of 100 pounds of the dry glue—and to express how much water is required to make this batch of dry glue up to a liquid of suitable consistency. We could as well figure it out for one pound of dry glue in pounds and ounces and fractions, but as fractions are cumbersome in figuring, it is more practical to use the figures for a batch of 100 pounds dry glue because we can then state the figures in full units and leave off the fractions, and still be accurate enough for nearly all practical purposes.

This method of expressing the water required to a certain amount of dry glue is often used among glue men as well as glue workers. We hear about such proportions as: 1 to 1, 1 to 2, 1 to 3, 1 to 4, and among the glue testers 1 to 6, 1 to 8, 1 to 10, 12, or even 16. But the drawback to the use of single units is that we have to use fractions if we shall express shadings—and between the proportions of 1 to 1 and 1 to 2 is located nearly the entire range of glue solutions as used for a majority of practical working purposes.

If we should express the water taking for a single pound dry glue we would have to use a set of unwieldy common fractions as the equivalents of the percentage figures. But by adopting the use of the figure 100 for which to express the amount of water required, we obviate this difficulty.

Instead of saying, we use that glue 1 to 1, we would say, we use it 100 to 100, and as this figure 100 for the amount of dry glue is always in mind and always understood, we don't need to mention it or even think of it; we only quote the other figure, the water taking capacity, and we say that the water taking capacity of that glue is 100, meaning it takes 100 pounds of water to 100 pounds of dry glue. Where we formerly said: "We can use this glue 1 to 2," meaning 1 pound of dry glue to 2 pounds of water, we should say: "That glue has a water taking capacity of 200," meaning it will take 200 pounds of water to 100 pounds of dry glue. The advantage of expressing water taking capacity that way is, that we deal with full units and that we have a range of 100 full points between the low grade glue taking water 1 to 1 and the high grade glue taking water 1 to 2. Such range is required if we shall be able to class our glues in distinct grades and be able to locate each glue with a fair amount of accuracy in the grade to which it belongs.

Another advantage is that the water taking figure here quoted has in each case and for the entire row of figures a definite relation and proportion to the percentage figures.

If we say we need a 50 per cent. solution of a certain glue, it means 50 pounds glue and 50 pounds water to make a batch of 100 pounds liquid glue. That is 1 to 1—even parts of glue and water, or one part of dry glue yields two parts of liquid glue—the other part being the water. Should we say we needed a 40 per cent. solution, it would mean 40 parts glue take 60 parts of water, or 1 to 1½, and figuring the proceeds from one pound of dry glue we find it to be 1 plus 1½=2½ pounds of liquid glue.—For a still better glue it might be a 33 1/3 per cent. solution, that is 33 1/3 pounds glue to 66 2/3 pounds of water or one part to two parts, giving us 1 plus 2=3 parts of liquid glue from 1 part of dry glue. Putting these three sets of figures together we see:

50 per cent. means 1 pound glue to 1 pound water, give 2 pounds liquid glue.

40 per cent. means 1 pound glue to 1½ pounds water, give 2½ pounds liquid glue.

33 1/3 per cent. means 1 pound glue to 2 pounds water, give 3 pounds liquid glue.

And that the yield of liquid glue from one pound of dry glue can be figured out by dividing the percentage figure into the figure 100:

50 into 100=2.

40 into 100=2½ or 2.5.

33 1/3 into 100=3.

If it is stated that a glue should be prepared in a specified percentage, say 42.0, and we want to know how much liquid glue—of 42 per cent.—we should have from 1 pound of dry glue, we divide 42 into 100 and find it goes 2.3810 times. It means that 1 pound of dry glue, prepared in a 42 per cent. solution, will yield 2.381 pounds of liquid glue, that is glue and water; deducting the glue we have 2.381—1=1.381 as the amount of water required. Or for a batch of 100 pounds of dry glue, we get 100 times as much of a yield 238.1 pounds of liquid glue, or 238.1—100=138.1 pounds as the water taking figure, corresponding to a 42 per cent. solution. To simplify matters we drop the decimal fraction where it is under 5 and raise the last figure by 1, where this fraction is 5 or over.

Where we want to know the yield from a pound of dry glue we use the figures which include glue as well as water; multiplying this figure by 100, which simply means the moving of the decimal point two places to the right, we get the yield from 100 pounds of dry glue.

Where we refer to the water taking capacity we use this yield figure less the amount of glue and state only the amount of water required. The water taking figure will therefore always be just 100 pounds less than the yield figure.

THE PERMANENCY OF PAINT

No single pigment has ever been discovered or made which would fulfill all the requirements of an ideal paint, writes W. G. Scott. Pigments which are practically indestructible, as barytes, silica and clay, are generally deficient in covering capacity and strength; on the other hand, the most useful pigments as lead and zinc are more or less affected by gases, water, fire, acids and alkalies, consequently the permanency of a pigment must be judged according to its use.

Whereas we can tell pretty closely from the chemical composition of a pigment what it will do under certain conditions and how it will be affected by water gases, etc., yet when made into a paint along with the other pigments and in conjunction with oils, gums and thinners, no amount of theoretical knowledge is of value in determining the actual life of the paint. Even weather tests, no mater how carefully made, cannot in all cases be relied upon to prove the absolute durability of a mixed paint, due not only to different climatic conditions, but to the man who applies the material.

Linseed oil before it has had time to harden by exposure, is very susceptible to the influence of moisture and takes on a decided "bloom" or turns a milky-white when brought in contact with water for any length of time, but when the film has undergone a certain amount of oxidation and becomes thoroughly hardened it is extremely waterproof.

Linseed oil enjoys the distinction of being the one ideal oil which may be used alone in nearly all kinds of paints, but the time will come when the admixture of other oils will be found necessary to overcome certain difficulties.

China wood oil is far more waterproof than linseed oil, but it cannot safely be used alone as a paint oil on account of its rapid oxidation.

Corn and cottonseed oils belong to the non-drying class, and are not considered as individual paint oils, consequently are only used in limited quantity to cheapen the mixture. As their character is neutral, they neither harm nor benefit the paint.

Neutral and heavier paraffin oils are extremely water repellant, but, unfortunately, they possess no drying property whatever. They are frequently used to administer linseed oil and a paint made with two parts of boiled linseed oil and one of neutral oil will dry on wood in about the same time as raw linseed oil; on iron, however, the result is different, and the

non-drying oil either separates or prevents the paint from drying hard.

Kerosene oil, like the paraffins, is water repellant and consequently durable, but lacks drying property. On wood, where it can penetrate and be absorbed, it gives good results in admixture with linseed oil, but greatly retards the drying of paint on metal or over a non-absorbent surface.

Rosin oil apparently dries very fast and certainly does set hard in a short time, but it softens under heat and expands or contracts with every change of temperature, consequently it is short lived.

Soya bean oil is a somewhat new product, and has not yet found much favor with the painter. It stands about midway between linseed and corn oil and is fairly durable, but does not dry as well as linseed oil. The high price of linseed oil will probably force this oil to the front as an adulterant.

None of the oils are greatly affected by sulphur fumes, gases and weak acids, but alkaline solutions and heat play havoc with them, the former converting them into soluble soaps, while the latter decomposes them. Dry air and a continued high temperature, especially with the thermometer at 90 degrees Fahrenheit, and a strong wind will harden an oil film to the extent of brittleness. The actual decomposing point of most of the oils is 750 degrees Fahrenheit and above.

In regard to the liquid solvents known as "thinners," only turpentine and benzine need be considered, although occasionally there are several others used in special mixtures.

Benzol, toluol, amyl acetate, acetone and dead oil are the liquids generally used in paint and varnish removers and are energetic solvents, consequently if a varnish or second coat paint contain such thinners there is always a tendency to soften up the under coats of paint, resulting in wrinkling or blisters.

Alcohol, fusel oil and ether are seldom used in the ordinary oil paints, but are an essential part of lacquers, wood stains and spirit varnishes.

Rosin spirit is very similar to turpentine in nearly every respect, but is not much used on account of its strong odor.

Turpentine is the ideal thinner and imparts the desired flatness to paints, a feature more or less lacking in the other solvents; furthermore, it does not abstract the oil from paints nearly so soon as the other thinners.

Benzine is a perfect thinner so far as dilution is concerned, but it does not possess the valued flatting property of turpentine, and is a great abstractor of oil, continued thinning eventually leaving the pigment without sufficient binder.

QUICK PAINTING AND COLOR METHODS

Quick methods and fast processes must be practiced in present-day carriage and wagon painting. And yet it does not follow that good and durable painting and finishing is not being done under these newer ways of working. It does follow, however, that about eevrything that finds a place upon the surface to round out the finish has been specially prepared by the manufacturer to meet the new trade conditions. After getting away from the primary coats the paints and colors are fast driers. Colors japan ground have been a great help to the painter in getting work quickly through the shop. And now comes the varnish makers with both body and running parts varnish made to dry free from dust in a couple of hours, and to be ready for service after a night's drying. Scientific varnish making and a knowledge of chemistry have helped the issue along. It will enable the painter to handle more work, do it quite as well, and during the busy season to increase business.

It is a mistake to assume that because all painting and finishing is being done on the jump there is no longer any room for the use of raw linseed oil in the painting schedule. Graduated quantities of linseed may still be used, and, in fact, are being used, in all the primary coatings. The supply is limited as compared to that formerly used, but under the adjustment provided for the smaller quantity is doing all that the greater quantity formerly did.

In the color coats there need be no decrease of the oil supply. A binder of raw linseed in the japan ground color will serve to hold the pigment securely in place and to provide the necessary elastic medium. All this use of oil in the various coatings is being worked through without delaying the onward march of the finish. It represents a mere uniform distribution of the binding medium. It responds to the new demand for quick results, the speedier drying varnishes now being used supplement it, and make quick and durable results an actual possibility.

It is not good practice to rub roughstuff the day after the last coat is put on to the surface. Two coats per day should not be put on except to meet an emergency call, and when the drying conditions are ideal—that is, when a warm, dry air prevails in the shop.

One coat of roughstuff applied to the surface each day is plenty, and when this practice is followed it brings the foundation dry and hard right along from day to day so that when the last coat is on the rubbing can be done the next day without trouble. To get a good, hard, nicely balanced structure of roughstuff, wrought out in fine shape, the coats must have time to dry out perfectly. This is a necessity in surface work which cannot be regarded otherwise than important. At the present time fine surface conditions and a superior grade of finishing are in great demand. Most of the striping and ornamental work has been lopped off, leaving it to the "surface man" to make the finish sufficiently good to meet requirements without the help of these agencies. In this surface building roughstuff must be used. To get the desired results it must be used right.

If anything, the ready to use stuff is as good if not better than the shop mixed. It is likely to be more uniform in quality.

It should not be left exposed to the air. It thickens in a short time when so exposed, and when fatty and sour it cannot be depended upon to dry and rub right and give proper service.

The pigment should be put on smooth and free from brush marks. It needs to be thinned properly to do this. Better thinner coats, even if an extra coat must be used, than heavy coats, which work on rough and brushy. Such coats are hard to rub down, and the rough appearance simply can't be rubbed out.

Business jobs shows many examples of yellow colors. If carefully and well placed upon the surface they compel attention by force of their attractiveness. Upon new work where the foundation is brought up from the base wood white priming and white primary surfacing coats may be used to greatest advantage. They flush up and keep the yellow true to shade and tone.

Over old paint surfaces to be converted into yellow fields, first sandpaper the paint down close and hard, making everything smooth and clean. This furnishes a good start, and a good start in bringing up the yellow surface is quite the correct thing. Then to the white lead mixture add just a pinch of drop black to throw the white to a light grey. This gives the coat body and covering power which white alone naturally doesn't have. Let this coat dry well, whereupon proceed to putty all defects and surface ruptures with a white lead putty, hard drying. Put putty on very smooth in order to eliminate to the minimum the work of sandpapering. Sandpaper in due time and next apply a pure white coat made up to dry flat. Then from this coat gradually fetch the true yellow out in perfect form.

Of the yellow there are many beautiful colors now being used upon business wagons. Most of these are solid colors, and all of them are best used over white grounds or basic colors. Dirty finger marks, or anything to mar the purity of the yellow, are not easily removed. All the yellows require attractive striping effects as a means of enhancing their good looks. Only the latest varnishes should be used on yellow surfaces.

The large elimination of striping has at least led to a refine-

ment of the work. If you don't see the elaborate patterns and sensational designs at one time so popular you may at least see in the greater and reduced effects a better and finer style of workmanship. The fewer lines have come to be truer and handsomer ones. The striping effects now permitted are of the very best class. The colors appear to be more carefully selected. They as a rule harmonize better. The whole appearance of the surface is rounded out and given distinction by the superior looking lines cast upon it. Neat and effective striping done in a simpler style adds to the beauty of latter day finishing. One and two lines of striping drawn beautifully in pleasing colors upon harmoniously contrasting fields of color produce far more pleasing effects than the tawdry finish and garish lines carelessly placed.

Inasmuch as varnish apparently has a more detrimental effect on deep and dark blue than upon light blue, the lighter you can develop the color, and satisfy your customer, the finer and more durable will the results be.

For a light blue first develop a light blue ground, over which lay a thin coat of the final blue to be used. Simply thin this blue with turpentine and apply with a flat camel's hair brush. Then in a pound of rubbing varnish stir, after first thinning with turpentine, one-fourth pound of blue. Mix out into a smooth limpid state and flow the varnish-color freely over the surface. Upon observation you will find this varnish-color going into and saturating the flat blue until the whole field of pigment takes on the splendor of the moist blue paste in the can.

Give this coat when dry a light rub over with a fleece-wool sponge, water moist, and dipped in pumice stone flour.

Then apply a second coat of this blue varnish-color. Avoid, if possible, the use of any clear varnish until the application of the finishing coat.

In the production of blue surfaces seek to get an even shade of ground color over all, with all putty spots and other necessary surface repairs covered perfectly. Bear in mind that no rich blue will withstand the blighting effects of clear rubbing varnish. After getting the blue field covered solidly and intact, and it is still necessary in order to develop the required quality of finish to apply additional surfacing coats, reduce the quality of blue used in the varnish to one ounce of blue to a full pint of varnish, thus maintaining the purity of the blue while bringing out the desired quality of surface.

Ultramarine blue, in three shades, is quite unsurpassed in splendor of tone and richness. Beautiful examples of this color are produced by using plain lampblack or dark brown ground. Apply the color as above described. An important point in this matter of using blue pigments is to get a uniform shade and tone of color throughout. Successive coats of varnish-color will accomplish this if worked over the proper ground.

RUBBER-SEED OIL FOR PAINT AND VARNISH

The latest issue of the Bulletin of the (British) Imperial Institute gives an interesting survey of the possibilities of "rubber-seed oil" extraction developing into an important industry. The article says:

Reference has been made to the fact that the kernels of these seeds contain about 42 per cent. of a liquid drying oil very similar in properties to linseed oil and capable like that oil of being used in the manufacture of paints and varnishes and other important industrial products. Since these kernels were first investigated in 1902-3, small consignments have been received from time to time in London and sold as oilseeds, but there has been no large development of this trade, mainly because the demand for seed for planting has been so large as to preclude the collection of seed for industrial use, and, further, the profits from sales of rubber on developed estates have been so large in recent years that little or no attention has been given to the utilization of by-products. Now, however, when the area of productive Para rubber plantations is increasing rapidly every year, it seems likely that this indifference to the possibility of using these kernels will disappear, and already the expression of oil from the kernels had been undertaken at one or more mills in the East Indies.

It is opportune, therefore, to call attention to several practical difficulties which may occur in dealing with these kernels, and to methods of overcoming them.

Considerable difference of opinion exists as to the cost of collecting Para rubber seeds. The late Mr. Carruthers, in his report as director of agriculture for the Federated Malay States in 1908, estimated that 1,000 seeds could be collected there for 2¼ cents American currency, and that 414,400 seeds would be needed to produce one ton of kernels. From these data he calculated that the cost of collecting and shelling one ton of kernels would be $11.84.

This estimate is considered far too low by Macmillan and Petch, who point out that in Ceylon the cost of collecting 1,000 seeds is 8 cents, and that Mr. Carruthers's estimate of the number of seeds required to produce one ton of kernels is based on the weight of seeds from untapped trees. It has been shown in Ceylon that seeds from tapped trees are smaller and lighter than those from untapped trees, and Macmillan and Patch estimate that from tapped trees at least 700,000 seeds would be needed to produce one ton of kernels. Accepting their data, the cost of collecting sufficient seed to produce one ton of kernels would be $56.77, which is certainly a prohibitive price so far as the export of these kernels as an oilseed is concerned. It should be pointed out that Macmillan and Petch's criticism of Mr. Carruthers's estimate is mainly directed to the question of the quantity of seeds required to produce one ton of kernels, whereas the principal difference between the two estimates lies in the cost of collection, which appears to be nearly four times as great in Ceylon as in the Malay States. In this connection it may be mentioned that Mr. Ridley, director of the Singapore Botanical Gardens, has suggested that the right of seed collection in plantations in the Straits Settlements might be leased to Chinese, who would be able to utilize for this purpose the labor of village children. If this plan is feasible it would appear to afford a comparatively simple solution of the labor difficulty in Malaya.

For shelling the seeds the installation of machinery is desirable. It is essential that the machine adopted should crack the shells without damaging the kernels, since the latter deteriorate somewhat rapidly when they are broken and exposed to air. This is of small importance when the kernels are to be utilized locally and at once for the expression of oil, but it becomes all important if the kernels are to be exported as such.

Kernels for export should be thoroughly dried in the sun before being packed in bags for shipment. When these precautions are taken the kernels can be shipped to Europe, and will arrive in sound condition.

In expressing Para rubber seed oil trouble may arise from the presence of fat-splitting enzyme in the kernels, as this is taken out with the water expressed along with the oil, and if this aqueous layer is left in contact with the oil, the latter will be rapidly hydrolized into glycerine and fatty acids. A similar fat-splitting enzyme, however, occurs in castor seed, and this occasions no difficulty in the industrial preparation of castor oil, and it may be assumed that with due care no trouble will arise with Para rubber seed kernels from this cause. In determining the value of an oil seed the amount of oil present is the factor of prime importance.

Recently a detailed examination of Para rubber seed oil has been made by Dr. S. S. Pickles in the Scientific and Technical Department of the Imperial Institute, and the results will be published shortly. The results show that the oil consists of a mixture of glycerides of linolenic, linoleic, oleic, and stearic acids, with possibly some palmitic acid.

The proportion of unsaturated acids present is lower than in linseed oil, as was to be expected from the slower "drying" character shown by Para rubber seed oil.

CHINESE, RUSSIAN, SIBERIAN BRISTLES

H. M. Baxter goes into the merits of various qualities of bristles for paint brushes in a way to increase the store of knowledge on such a subject.

No one outside of the actual bristle producing region of China has any knowledge of the methods used in preparing and dressing the bristle. Therefore it has always been a disputed question as to whether Chinese bristle is dyed or is naturally black in color. Either it is dyed or all Chinese hogs are either dead black or pure white, as those are the only two colors contained in the bristle exported from China, past or present. It is sufficient to say, however, that if it is dyed it must be a wonderful process as the bristle will hold its color in any kind of liquid used in painting, varnishing or cleaning. Fear on the part of master painters that it was dyed and that the color would run was perhaps the most potent cause of the long delay in substituting the black Chinese bristle for the white and yellow Russian, Siberian and German stock. In Chinese bristle there are almost as many qualities and gradings as in all other bristle combined.

First comes the "Tientsin," a comparatively soft bristle, and very solid. This subdivision is divided into almost innumerable brands—the mark usually of the house or firm that exports it from China, though some of the brands are represented to be the mark of the packer. Most of these brands have in the past run fairly uniform from season to season, some excellent in quality; other medium, and some very poor, therefore ranging several cents per pound different in price.

Then come "Hankows," much stiffer than "Tientsin," and decidedly "taper," and also divided into many gradings, ranging through all qualities and prices. Many, in fact most of the Chinese bristle brushes, are made from a mixture of "Tientsin" and "Hankow," so as to secure the correct elasticity for the purpose. Then, through various gradings and divisions, we find "Cock Chop," "Anchor Chop," "Superior Hankow," and perhaps five or six other important names—some suitable for the very best paint brushes.

Altogether, if all other bristle supply was abruptly stopped and sufficient black Chinese bristle was forthcoming, no painter would need to have any reason to complain, as his every need could be supplied most satisfactorily. Many of the railroads and large manufacturers who purchase their brushes on printed specifications and blue prints, have already specified Chinese bristle on many of the items, and more will undoubtedly do so in the near future.

Russian bristle has only one decided advantage over its Chinese relative and that lies in the flag or tiny split ends where the bristle is exposed to the weather. This flag or split end is the means of smoothing out the paint, and the "taper" in all good brushes is caused by the short bristle placed and mixed so as to keep a flag constantly on the end of the brush as it wears down. In Russian and Siberian bristle, produced where the cold is extreme, this flag is long and very fine, often consisting of four, five and even six hairlike subdivisions. These flags probably mat into a very complete protection for the hog's hide, shedding the ice, snow and cold during the long, hard winter. In the Chinese bristle this flag is shorter and much coarser, very likely due to the difference in altitude and climate. This can be very largely overcome by the brush manufacturer through a different style of dressing by making the flag ends of the Chinese bristle brush come more closely together. This is usually done by all the good manufacturers, some few even going so far as to dress their brush mixtures to one-eighth inch sizes instead of quarter inch.

Even when all black Russian or Siberian bristle is used in a brush it can be easily distinguished from the Chinese, first, by the different sheen; second, by its flag, and third, by the greater amount of "barb" on the bristle stem. Russian stock has a most decided "barb" (like that on a fish hook, only encircling the bristle) with the hook pointed toward the flag. To prove this yourself, pull a bristle from a white bristle paint brush, lay it flat on your palm and rub the tips of your fingers back and forth over it. You will fint it will creep along after the butt end with the most surprising rapidity. Or put it in your mouth and see how quickly it will go down your throat, and be careful it does not get beyond your reach or you'll have trouble. This barb probably grows on the bristle so as to prevent anything (water, ice, snow, etc.) from working down to the hog's hide. On Chinese bristle this barb is almost a minus quantity, hence giving a ready means of identification.

In applying paint this difference in the barb is comparatively unimportant, though probably it is slightly in favor of the heavier barbed stock, as the barb undoubtedly assists in picking up and holding a heavier load of paint and also prevents its coming out of the brush too quickly. If the hooks were pointed in the opposite direction they would naturally cause a much greater difference.

There is no doubt but that a good Russian or Siberian bristle brush will do a little finer work; that it wears a little longer; that it will carry a heavier load of paint and distribute that load more evenly than a Chinese bristle brush of the same size, shape, weight and length. But the price is considerably more; therefore each painter working for himself or a contracting painter, must weigh all the points of difference and decide for himself just which bristle is best suited for each purpose. If he gets a good brush and watches the results carefully he may find a saving in using Chinese bristle for certain purposes and Russian stock for others. It would not be good for the brush manufacturers or the bristle producers if all painters thought alike, but most brush makers and sellers are more anxious to please their customers than to try to boost the use of any one kind of bristle.

SHELLAC VARNISH

A pure shellac varnish, under proper conditions, should be fit to handle six minutes after its application, and it ought to be fit to take sandpaper in thirty minutes after the coating has been applied. The second coat should dry in seven minutes, it having been applied thirty minutes after the first coat. After a lapse of two hours you may apply the third coat, which should be hard to the touch in ten minutes. In one hour after applying the third coat it should be fit to rub down perfectly in oil and pumice stone powder.

Orange shellac, as well as bleached shellac, will dissolve in pure wood or grain alcohol without residue, if pure. The stronger the alcohol the more gum will it dissolve. Alcohol, as most persons know, is like a sponge for taking in water or moisture. Hence it is that alcohol may vary in strength. If it has long been on hand, not perfectly sealed, it is apt to contain not a little water, therefore is weaker than you may suppose it to be.

Pure alcohol, that without the least moisture or water, is called absolute alcohol, but this is a commercial impossibility, not obtainable by ordinary distillation, and effected only by the use of some dehydrating substance, as quicklime. Commercial absolute alcohol contains about 1 per cent. of water, and is used for special purposes. As used in the U. S. Pharmacopoeia alcohol means a solution of 91 per cent. by weight of ethyl alcohol and 9 per cent. by weight of water. Proof spirit or dilute alcohol contains 45.5 per cent. by weight of alcohol, and 54.5 of water. It is important to understand these matters in order to be able to account for some of the troubles with shellac.

A great deal depends on the method employed in making shellac varnish, as to temperature, etc. In the case of orange shellac, given the same degree of strength of the solvent, there will always be a uniform result in the varnish making.

It is generally known among varnish makers at least that rosin and gum resins are precipitated from their solution in alcohol by the addition of water. The affinity of alcohol for water is so great that if only a very little water be added to a solution of alcohol shellac the water will combine with the

alcohol while part of the shellac will at once separate from the solution and settle to the bottom. If therefore the alcohol contains any water it will cut the gum more or less poorly and will take up the gum in a correspondingly small quantity, while the solution will always have a tendency to settle or form a residue. The alcohol should be 95 proof, not less than that, if it is to do good work. Even the gum must be pure or there will be trouble, as already pointed out.

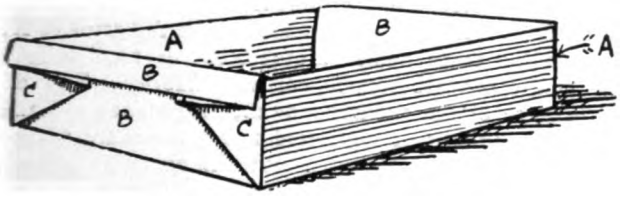
Here is a sample formula for a doped shellac varnish:

Grain (ethyl) alcohol	34 gal.
Acetone	1 gal.
Sulphuric ether	1 lb.
Orange shellac	200 lb.
Pale rosin	150 lb.

If we mix rosin with pure orange shellac in the proportion of one-fourth of the latter to three-fourths of the former we get a varnish that will dry in the same time as pure orange shellac varnish, while its adhesive power will be equal if not superior to the pure alcohol-shellac varnish. But the pure shellac will give a harder coating than the one containing rosin.

PAPER HOLDERS FOR COLORS

In lettering it is necessary to have occasionally small quantities of various colors. To obviate having a number of small pots in which to hold these and which would call for frequent



cleaning, a simple method is to make paper color holders. Such a holder is shown in the accompanying illustration. It may be made from paper knotted two coats on one side, and cut into pieces measuring 5½ x 3½ inches. Pieces of paper so cut and prepared may be stocked in one's kit and folded when required in the following manner: Folding the margins of two sides of the sheet of paper a quarter of an inch. These correspond to AA in the sketch accompanying. Fold the ends (B), one and a quarter inch. Fold ends and sides inward. This will result in surplus paper (C) at each of the four corners which fold round the end of each corner indicated at C. This still leaves the upper edge of the holder at each end standing up about half inch. Fold this outward and downward, and it will secure the corners and make a compact and liquid proof box.

SANDPAPER AND TURPS

The vapor of turpentine is objectionable to nearly everyone, especially in a closed room; but this does not hold with regard to the so-called mineral turpentines, which are petroleum distillates much heavier than benzine and not leaving a greasy residue on evaporation as kerosene does. These liquids are cheap, and their use does not involve any serious fire risk.

The use of such material will effectually prevent dust; it is only necessary to have a little in a shallow pan and wet the sandpaper in it. The cost is almost negligible, not important, and the work is done much more quickly, and therefore, so far as labor is concerned, cheaply.

The only objection so far raised has been that the sandpaper quickly becomes filled with the wetted paint dust, but it can be used effectively even when it appears to be clogged; and, what appears to be little known, it can be held in a stream of water running from a faucet and most of the paint washed out. The mineral oil has saturated the paper and keeps the water from softening either the paper or the glue which binds the sand. In fact, the paper then appears tougher than when dry.

SANDPAPERING SURFACES

The practice of rubbing down painted surfaces with sandpaper is common; it is sometimes done on old work to secure a good surface for repainting, and at other times new coats of paint are sandpapered as soon as they are dry and hard enough in order to get a more perfectly smooth and highly finished effect when the last layer of paint or varnish is applied.

Formerly this was done by rubbing with pumice and water, or pumice and oil; this produces a finer and better result, but is slow compared with sandpaper, and the latter is now considered good enough for any but the best work.

The most extensive and important use of this method is in shops like carriage, automobile and car shops, where men work continually in the dust which results from such sandpapering. Now, it is well known that paint is not made to eat, still less to breathe; and the dust thus produced often causes illness.

This danger has attracted the attention of sanitary inspectors, and in at least one of the great car shops they have, with good results, forced the installation of an elaborate and costly system of forced ventilation and dust removal.

Dust was not produced by the older method of using pumice with water or oil; but it is obvious that sandpapering cannot be practiced with water, which would quickly reduce the paper to a pulp; and there are certain objections to the use of linseed oil for such purposes. It has, however, long been known to a relatively small proportion of painters that sandpaper can be wetted with spirits of turpentine, and that when so wet it cuts several times faster than when dry.

COVERING GLASS FRAMES

The tenons should in all cases be made on the cross or end pieces, and the mortise in the sides or uprights; this is for the purpose of having the laps run up and down, there being a less liability of the cloth getting out of the joints left open enough for the purpose of entering the cloth. The mode of covering a frame is this: Make your paste of good wheat flour, with a little resin or glue size; not too stiff, for very stiff paste will not work too well on the cloth. The paste should be extra well cooked; when so done it will stand almost equal to glue, providing the frames, after covering, are well dried before being exposed to the weather. The cloth should be sponged, then cut lengthwise the length required, and wide enough to go around the frame and lap in the bottom of groove. The glass coming in upon this, the cloth is firmly held, with no likelihood of getting out. Turn the cloth into the joints, allowing it to remain till dry, then cut. Trim the cloth off when all are covered, clean the glass and put them together, and fasten by putting a gimp tack in each corner, driven from the inside, and sew up the ends neatly and put on the glass string and the frame is completed.

A BAMBOO BRUSH

The Chinaman makes a good scouring brush this way: He takes a piece of bamboo out of a tree a foot in diameter. The piece being only about four inches wide, but as all bamboo is hollow, the wall is apparently two and one-half or three inches thick. The piece is about four feet long. It was a section between the joints.

The Chinaman splits the bamboo in splints and once the splint is started it runs to the end of the piece, clean and true. The bamboo is kept in water when he is working at it.

After a sufficient quantity has been split cut off several pieces about seven inches long to make a bunch one and one-half inches in diameter. These are temporarily tied with a string. One end of the string is made fast, pulling on the other end and at the same time the bamboo bunch is held in the bight of the string.

In this way the pieces are worked closely together and packed into an almost solid mass. When they are solid enough to

suit, they are wound with a piece of bamboo, the string removed, and one of the best brushes is the result.

These brushes are used by the Chinaman for dish-cleaning purposes. They can be bought in a Chinese grocery store at the rate of five cents apiece.

These brushes would be a mighty good thing for use around the planer for use whenever any mud-covered lumber came to that machine. After figuring a little bit, a broken fish pole was found. This was cut up, sawing the joints out, then it was put into the water underneath a glue heater and steam turned on for a couple of hours. It was found that this bamboo would split almost, though not quite, as well as that used by the Chinaman. And the brush which was made up simply took the cake for cleaning mud off of rough lumber. One of these brushes is also fine for removing sawdust which has been packed upon a board by a saw carrying too much set.

THE THEORY OF PURISM

Pure white lead, pure white zinc, pure linseed oil, pure turpentine, pure this, that and the other may be employed, and are used every day to produce paints of little value and utility; pure pigment, pure binder is a relic of past ignorance. When one considers that most pigments are allotropic, that paint liquids are rarely alike, and that paint changes in many ways with age, the chemist's test by itself is of little value. Chemistry can no doubt tell us the things that have been used in making a paint, but it cannot very accurately define its physical state, nor can it foretell what the paint will do, and it is only what it will do that is the true measure of its value and worth.

The value of a pigment is not defined by its chemical composition; white lead or oxide of zinc may be chemically pure and yet be of no use whatever as a pigment, consequently it is undeniable that the physical state has a preponderating influence. Undoubtedly there are allotropic states different from the matter, that is to say, modification in the nature of crystallization, also—from the chemical point of view, the presence of a certain matter in small quantities has a great influence on the physical state.

THE KEROSENE MOTOR HERE

A. O. Brooke, of Milwaukee, talks of his device, and with a free hand sketch (reproduced) gives the details. We want to give the latest news, so add this to our inventory.

A is the oil tank under the seat of the motor car containing the supply of coal oil. It is exactly similar to the tank for carrying gasoline. B is an oil pipeline carrying the oil to the float chamber C, where a constant pressure is maintained on the heater pipe D. The heater pipe D runs from the float chamber C through the exhaust pipe E to the mixing tube G where there is a suction from the engine causing the oil to rise in pipe D closer to the exhaust manifold F where it is boiled into gas from the exhaust heat. As the gas is made it is carried on up the pipe D to the mixing chamber G, where it is mixed with air and taken into the engine and fired in the regular way.

The proper mixture is automatic with the throttle. As the throttle is opened it causes a greater suction at the end of the heater pipe, causing the oil to rise closer to the exhaust. Therefore, a greater quantity is exposed to heat, caused by a larger charge being fired in the cylinders. When the throttle is closed again the oil will settle back in the float chamber and produce less gas.

There is no delicate carburetor mechanism to get out of order and demand adjustment.

The only part of a motor car carburetor in use on this coal oil driven car is the throttle valve. The rest of the old fashioned carburetor is worthless.

"MOTOBESTOS" VANQUISHES "MOTORBESTOS"

After two years of litigation, claims and counterclaims between the Asbestos & Rubber Works of America and the American Asbestos Co., claimants respectively of the trade names "Motobestos" and "Motorbestos," Examiner of Patents H. E. Stauffer has allowed the claim of the Asbestos & Rubber Works to the trade name "Motobestos" as applied to brake lining and other asbestos-copper wire fabrics. The dispute arose because of the similarity of the two names and the discovery that neither was registered as a trade name, whereupon both made a rush for the patent office in an effort to have one of them adjudicated.

DUSTY CONCRETE FLOORS OF SHOPS

The Aberthaw Construction Co., Boston, Mass., contracting engineers specializing in concrete, recommend the following method of curing a dusty concrete floor: Get the surface entirely dry, then paint it with a mixture of boiled linseed oil thinned with gasoline. Give it several coats, until the oil shows glossy on the top. The theory of this is that the linseed oil having been boiled has lost most of its volatile components and is practically permanent. The gasoline thins this down enough so that it will strike into the pores. A little experimenting will show the proper proportions. The thinner it is the more coats will be required and the deeper it will strike in. The floor that is making serious trouble with dust can often be cured with very little trouble and expense in this way.

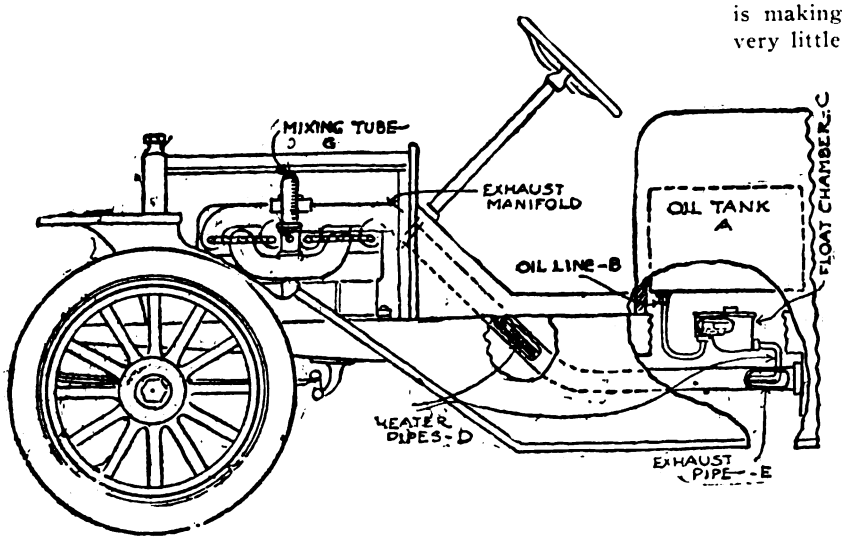
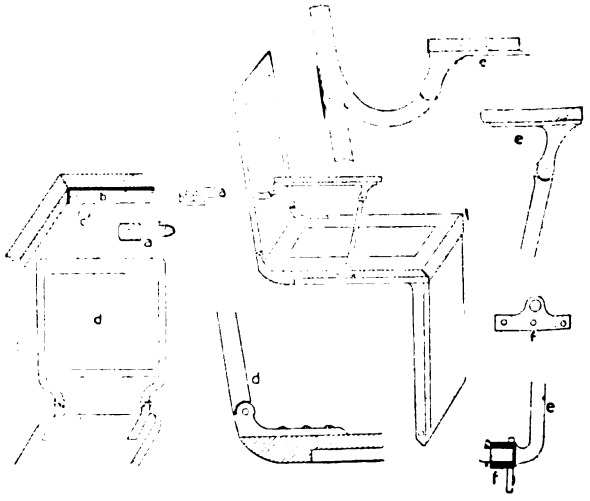


Diagram of a Motor Car Showing the Operation of the Kerosene Engine



Details of Spare Seat Construction (without description)

Wood-working Shop

SEASONING TIMBER FOR WHEELS

Seasoning does not mean merely drying. The primary object is to impart durability. This can only be done by abstracting those vegetable matters which in life are essential to the tree, but which in conversion will, if not carried off, destroy the fibres of the wood and render it worthless.

The next object sought is to impart stability to the wood, to prevent it from twisting or otherwise changing its form. This is accomplished by drying; the drier the wood the less its liability to warp.

Every part of a tree, whether leaves, bark, wood or roots, is either composed of cells or of some substance formed from cells. The cell walls constitute the fibres of the wood. Cells, which are very rarely visible to the naked eye, vary greatly in shape, size and action, owing to several causes, and are, of course, largest in the trunk, or main stem.

We will not attempt to refer, however slightly, to the various phenomena of movement exhibited by a tree, and must content ourselves with the knowledge that all life and development in plants are mainly dependent on a substance contained in the cell. This wonderful substance, which is called protoplasm, is not only the true body of the cell, but the life of the tree, and the origin of all new growth. It is chiefly by and from protoplasm that all new cells are formed, and the tree made capable of continual change. The cell wall is formed by protoplasm out of itself, and only such cells can grow and produce new cells as contain protoplasm.

A piece of oak a little more than one-sixteenth of an inch thick, cut transversely, and seen through the microscope, presents a truly marvelous arrangement of cells and vessels of every conceivable shape, strangely analogous to the gnarled, knotty and eccentric appearance of the tree in which we find them. The larger openings are vessels caused by several cells uniting and forming one; the inside division walls of the cells frequently disappear, but the union continues at the margin. Passing in large currents from the root through these vessels, and permeating the cell wall, the water is distributed all over the tree, and what is left disappears through the leaves in a manner that may be compared to the perspiration of the human body.

In the spring, when the temperature rises above winter limits, and vegetation awakes from the repose of the cold months, the organs of the tree commence to exercise their functions. The roots thaw, the sap is let loose and begins its upward journey, rising from cell to cell, mixing and combining with the various reserve materials contained in the cells, and undergoing the mysterious chemical changes in its progress until reaching the upper side of the leaves. Here takes place a purifying process, all surplus or injurious matter being thrown off by the leaves. The sap in its altered condition is now termed cambium, and possesses the true elements for the formation of new wood. It descends in the form of a thick, gummy matter between the last layer of wood and the liber, which is the interior layer of the bark; here it congeals or hardens, and commences to form cells similar to those of the wood. Two rings or layers are thus formed, one being sap-wood and the other bark. The consequences resulting from this formation are various, a very necessary one being an increase in the size of the tree; but the result which concerns us most at present is the change of the sap-wood of previous years to heart-wood, which is in the majority of trees the only part of any use in our trade.

It will be remembered that the cell walls compose the fibres of the wood. Now, as the sap-wood is formed it cannot expand to the extent that is necessary for its growth, the consequence being that it excercises a compressive force on the previous layers. The cell walls are thus pressed together, and being lignified or rendered hard by the action of the fluids they contain, the wood becomes firm and compact. The bark also plays a prominent part in this process, as, by the continual increase of the annual rings, it becomes, as it were, too small for the wood, and must consequently expand; but expansion does not take place without a certain amount of resistance, and by this resistance pressure is exerted on the layers underneath, and the change of sap-wood to heart-wood assisted.

The annual layers, or concentric rings, are usually considered a sure guide for calculating the age of the tree, but beyond this there are one or two points. We often see them sharply defined and easily counted with the naked eye; at other times, even in the same tree, their outline cannot be accurately decided on without a magnifying glass. This teaches us that the years in which the well developed layers were formed were most favorable to the growth of the tree, while those rings that can scarcely be traced prove that their formation took place under unfavorable conditions.

Seeing how often the assertion is made, it would appear needless to say that hedge-row timber (the term hedge-row means any open space) is superior to that grown in a wood or coppice; but we are seldom told that there is any material difference in the formation of the wood. If we compare a tree grown in the wood with one reared in the open we find more sap-wood on the latter, sometimes twice as much as on the wood-grown timber. Now this extra sap-wood proves, if any proof is needed, that the greater heat of the atmosphere has acted in the most healthful manner on the vessels of the wood, opening them, and allowing a circulation of air and moisture, which results in the formation of more additional matter. Hence the soundest and most durable heart-wood is found on the tree having the greatest quantity of sap-wood.

As to the proper season of the year for felling timber, it is unnecessary to say anything further than that it should be done in the winter. Winter-felled timber is less liable to shakes than any other. It contains the least possible quantity of unconverted matter, and is consequently the most durable.

The age at which timber is best suited for wheel making is also a point of importance, and although a definite limit cannot be fixed, forty or fifty years for ash, seventy or eighy years for oak, and fifty years for elm may be taken as the most suitable periods for felling, as at those times the wood possesses in the greatest perfection the three essential properties of toughness, strength, and stiffness.

A precaution that should not be neglected after felling is to raise or skid the timber from the ground. A tree should never be allowed to lie where it can absorb moisture.

In dealing with this part of the subject, we may class the spoke and felloe woods (hickory, ash and oak) together, as they must be sawed or cleft, whereas elm is used in the full thickness of the young tree.

It should be remembered at the outset that the slower the seasoning the more durable the wood; hence we must decide how long the tree should lie in the round. This question is answered in many different ways. Some people say three, some say six months, and others say cut it in less than two months.

To obtain wood of the soundest possible kind, little liable to

warp, twist, or split, after planking or celaving, the tree should lie twelve months.

Timber that has been slowly seasoned possesses a toughness that is not to be found in that which has been forced.

The tree must be kept perfectly free from contact with the ground, or with any substance containing moisture. One tree must not be piled upon another; a free circulation of air should be secured from every side.

There is another advantage in the plan indicated, as a considerable portion of the sap-wood is converted while the tree is lying uncut, whereas it would be wasted if the wood were planked or cleft sooner.

It will, of course, be understood that this slow-drying process does not apply with the same force to timber that has been barked before felling. Oak, for instance, that has been barked will, as a rule, be felled six months afterward, and, therefore, does not require more than four or six months' preparatory seasoning. It will also be observed that the object of barking and allowing the tree to stand is precisely the same as is aimed at in allowing it lie in the round.

This plan is the most efficient within the wheel-makers' power for ridding the wood of those waste matters detrimental to its quality after conversion. There is a readier and more effectual way of accomplishing this, and it is practiced in some country districts at the present time, with spokes particularly, i. e., to submerge the wood in running water for a month or two. This carries off the juices without trouble, especially if the wood is placed horizontally, as in this position the water can flow through the sap vessels. All matters not converted into wood are thus eliminated, and, as a natural consequence, the timber is peculiarly free from shakes, and it dries rapidly and thoroughly. It is a plan practically beyond the reach of wheel builders in large towns, and the other process is the best substitute.

Ash for felloes, after being planked, must be cut by a saw to templets of the required curve, the grain in all cases running with the length. They should then be piled or stacked in the open, completely protected from sun and rain, with dividing sticks between each row to allow free circulation of air around the wood. This simple plan of dividing the pieces should never be neglected; it is of the first importance. After drying in this way some nine or twelve months, they should be removed to the drying room and there stored in a similar manner until they are thoroughly dry and ready for working up, which will take another year.

For spokes, we cross-cut the logs into lengths varying from twenty to twenty-eight inches. These pieces are cleft with wedges. The wedge-shaped pieces are then riven or cleft into pieces of suitable dimensions. They may then be treated in a similar manner to felloes. It is well known that cleft spokes are stronger than those that have been sawed, but cleft spokes are also more durable because the fibres are intact, whereas in sawing them are invariably cut, and moisture readily finds its way into the interior of the wood.

Elm hubs are formed from the butts of small trees, which should be cross-cut into lengths of nine feet. This may be done much sooner after felling, say three months, as the wood is neither planked nor cleft. The nine-feet lengths should be stacked in the open air, protected, and should remain there nine or twelve months.

The pith must next be removed by boring a hole completely through the piece from end to end in a lathe. This must be done in the center; otherwise the wood will split. It is irregular drying that causes timber to split. The larger the surface exposed to the action of the air the quicker and more complete will be the drying; therefore, it is desirable to bore this hole in order that the air may reach the interior of the wood.

To season a hub properly is a somewhat difficult task, and requires more care and attention than is the case with spokes and felloes.

It is desirable to remove part of the sap-wood with the bark. All wheel timbers should be dressed as near their final dimensions as possible, so that the air may penetrate to the greatest possible depth. It is always difficult to say when a piece of wood is really dry, as, if we take a piece apparently quite dry, and plane the surface a little, it will shrink very perceptibly in the course of a few days, and will continue to shrink if the process is repeated several times.

In the drying room for hubs the light should be subdued, and above all things, there must be thorough ventilation, but there must be no draughts. These results are easily attainable if the proper means are taken to secure them. The hubs must be placed on their ends in rows, separated, of course, by dividing strips, and they must be turned over once every three months, for this reason: the evaporation of moisture is greater from the ends than from the sides of a piece of timber, and, again, it is greatest from the end that is uppermost; hence, to secure equal dryness both ends should be treated alike. It is recommended to give the ends of the hubs a coat of paint, resin, or a mixture of boiled oil and tallow.

The foregoing remarks apply to hickory, oak, ash and elm, which are commonly used in wheel making. Beech, teak, Spanish chestnut, greenheart, fustic and several other timbers have been used at times, but they have disadvantages which render their general adoption impossible.

BLEACHING WOOD

To bleach stains out of wood a number of points must be observed to make a successful job and to prevent the after effects from the bleaching materials and chemicals.

Soft wood or close grained woods, such as pine, etc., requires bleaching at times as well as hard woods, and the treatment of either of those woods is almost similar.

The stains usually required to be bleached out of wood are weather or water stains, alkali stains, color stains, particularly aniline stains, dog and cat urine stains, iron rust stains, etc.

The hard woods which are easily affected by the weather by alkalies, etc., and which are difficult to bleach, include all woods containing tannic acid in a larger or lesser degree and include oak, mahogany, cypress, birch, cherry, chestnut, walnut, ash, etc. All sappy or white woods are more easily bleached, such as pine, spruce, hemlock, whitewood, poplar, maple, bass, gum, and similar woods.

The bleaching out of rust stains and dog's urine has been the source of a special difficulty and has so far withstood all usually employed methods, but, nevertheless, it is an easy matter.

As mostly all of the wood to be bleached has some kind of a finish, it is of importance to have the finish thoroughly removed before starting the bleaching process. In the case of using a remover containing oil or wax, a final cleaning must be done with soda water or alcohol, to remove all traces of the wax and to allow the bleaching material to affect the wood and to penetrate.

As all methods for bleaching wood are based on water soluble chemicals, it is impossible to avoid the sponging up of the wood or the raising of the fibre of the wood.

To bleach small articles it is advisable to have a wooden tank made of sufficient size to immerse the articles to be bleached, which also would make a perfect job and save a good deal of the bleaching material, although this is very low priced.

The tank for this purpose must be properly joined. No nails or other iron parts should be used on it, and the joints should be bound with white lead putty or casein. A porcelain lined metal tank would also answer the purpose or a rubber coated tank would be advisable. For ordinary bleaching of surface-weather stains the following solution is sufficient: One pound oxalic acid dissolved in one to one and one-half gallons of hot water.

For a more deep rooted stain an addition of strong white vinegar, or still better, acetic acid, is required and the bleaching liquid should be applied as hot as possible, repeating the appli-

cation of same until you are sure that the bleach has gone as deep into the wood as the stain itself.

After bleaching it is required to thoroughly wash the surface and an extra sponging off with vinegar is essential.

To bleach aniline stains apply a strong solution of chloride of lime and after a while wash off with clean water after which apply the oxalic acid method as above given. If the stains do not yield to this treatment apply a solution of tartaric acid and treat afterwards as above.

For rust stains the same method is to be used, but in bad cases, instead of using tartaric acid, diluted hydrochloric acid, or a solution of citric acid will do the trick.

The chloride of lime method is to be used for dog or cat urine stains. In all cases the oxalic treatment afterwards is required.

The methods therefore of removing such stains are simple enough, but great care must be observed in the handling of those chemicals, as all of them are more or less dangerously poisonous.

In refinishing the wood the following is to be strictly observed to make a perfect job, and particularly if the wood has to be filled or stained to avoid a spotted or clouded appearance of the finish, said George Whigelt before the Master Car Painters. After thoroughly cleaning and drying of the bleached surface do not sandpaper, but apply a thin coat of shellac which must be pure, greatly reduced with alcohol, about one-half the strength of the regular article used for finishing.

Allow 24 hours, or as long as possible, for the shellac to dry; after which sandpaper and only then start your staining, filling or whatever finish is required.

I have successfully used this method, but have found a good many wood finishers who could not see the advantage of it; in fact, some of them considered themselves so far advanced in their profession that they laughed about it.

I suggest that you do a part of the work by your own method and another part as above given. The result will prove to you the great importance of my method. The shellac, be it ever so much reduced, will harden the raised fibres of the wood and by sandpapering (or using steel wool) they will cut the fibres off short, making a perfectly smooth surface; furthermore, the softer parts of the wood will absorb the shellac to same extent preventing the stain or colored filler to accumulate in those parts more than on other sections of the surface, and will give a more uniform finish. This is particularly important and apparent where crosscuts of the wood are intended to show a uniform finish or color with the balance of the job. This treatment with shellac is intended for exterior as well as interior work, and is in no way detrimental for the best exterior work, providing the guaranteed pure shellac is used.

If aniline stains are not intended to be removed, but you wish to prevent them from striking through subsequent coating, particularly enamel or paint, etc., the following method is recommended to set or make such stains permanent. Take one pound of green copperas (ferro sulphide) and dissolve in one to two gallons of hot water. Add to it one-half the quantity of alum and apply one to two coats of this over the surface.

RECEIVER FOR C. D. FIRESTONE REAL ESTATE

Frank Vance was appointed receiver for the real estate of C. D. Firestone, former president of the Columbus Buggy Co. The real estate is valued at $100,000 and there are mortgages of $56,000 on it. Chicago banks are seeking to set aside transfers of real estate made by Firestone to his wife shortly before the failure of the buggy company.

CEMENT FOR STOPPING JOINTS, ETC.

White lead in oil mixed with enough white sand to make it a stiff paste. This grows hard by exposure and resists heat, cold and water.

PRICE OF AMERICAN CARS IN ENGLAND

A very extensive list (540) of cars selling at different prices, native and foreign makes, has been compiled by The Motor in England. From this lot we have extracted the American made cars and give the English price. The carrying capacity, whether two passenger (2) or more, is given by the numeral in parenthesis with the price of car.

Ford 20 (2), $675.
Ford 20 (4), $750.
Maxwell 22 (2), $875.
Hupmobile 12-14 (2), $940.
Mitchell 22 (2), $1,000.
Studebaker 15-20 (2), $1,000.
R. C. H. 15.9 (5), $1,035.
Marathon 20-25 (2), $1,050.
Hupmobile 12-14 (4), $1,050.
K. R. I. T. 15 (5), $1,050.
Waverley 10.5 (3), $1,125.
R. C. H. 15.9 (5), $1,125.
Marathon 20-25 (5), $1,125.
Hupmobile 15-18 (2), $1,125.
Buick 16 (2), $1,150.
Overland 20-25 (2 or 5), $1,175.
Hupmobile 15-18 (4), $1,175.
Buick 16 (5), $1,250.
Waverley 13.9 (2), $1,250.
Maxwell 25 (5), $1,250.
Paige-Detroit 22.4 (2), $1,250.
Buick 20 (2), $1,350.
Oakland 15-20 (3), $1,425.
Mitchell 22 (4), $1,500.
Buick 20 (5), $1,500.
Oakland 15-20 (5), $1,500.
Stoddart 25 (5), $1,700.
Chalmers 25 (5), $1,825.
Mitchell 32.9 (5), $1,875.
Buick 30 (5), $2,000.
Oakland 26 (5), $2,000.
Cadillac 20-30 (5), $2,365.
Hudson 28 (5), $2,625.
Oakland 40 (5), $2,750.
White 20-30 (5), $2,975.

It will be interesting to compare these horse powers, seating capacities, and prices with the quoted values in the American market.

NOT AS MUCH AS THEY SHOULD

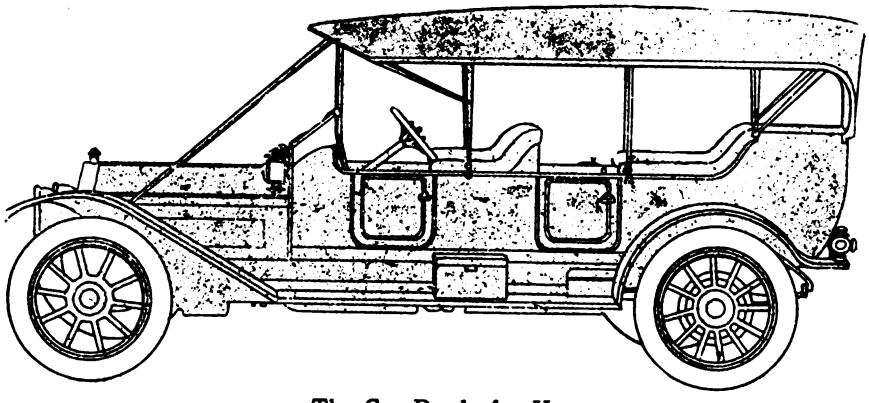
The Americans take a great deal of practical interest in their day school of carriage building, and support it financially with a generous hand. The latest development is that two members have been added to the board of trustees representing the motor trade, so that the way is made easy for broadening the scope of the instruction in keeping with present-day requirements. It is suggested that motor manufacturers should be admitted to the Carriage Builders' National Association, a matter in which the Americans are a long way behind our Institute, who, this year, have elected an automobile engineer as president. In America components of the chassis are more readily obtained than at home, and it is suggested that the carriage builder should assemble his own chassis. This advice is all very well when the motorist merely demands a car, but in Great Britain the majority of users look for a name with a reputation, in addition to a mechanical vehicle.—Auto and Carriage Builders' Journal (London).

WILL MAKE STORM BUGGIES

The Findlay Carriage Co. has acquired the right to manufacture the "Favorite" storm buggy invented and patented by John P. Cost, of that city.

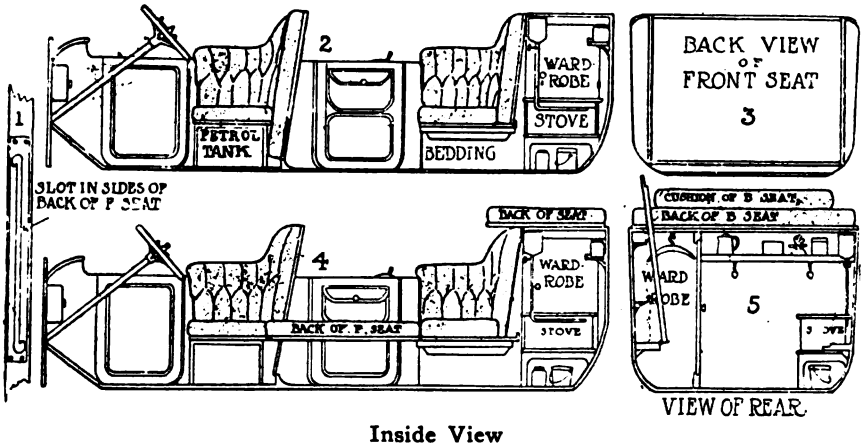
CAMPING TOURING CAR

The sectional views illustrate the appearance of the interior of the car ready for the road, the combined wardrobe and kitchen occupying a space behind the rear seat. The front seat is arranged so that its back may be tipped backward, the back of the seat having a slot in it of the shape indicated in sketch 1. To lower the back of the front seat, first press down on the back to release the pin in the slot shown in 1; then raise the back until the pin slips into the end of the slot and then lower the back until it rests on the rear seat. The back of the front seat travels on a pin protruding from either side of the body, the head of which is inserted in a slot. This pin locks at either position by slipping into the end of the slot. The back of the rear seat lifts up and can be placed on the top of the rearward extension of the body which forms the kitchen and wardrobe.



The Car Ready for Use

The bed is formed by the front cushion, the back of the front seat, and the rear cushion as shown in 4. Entrance to the kitchen is given by placing the back and cushion of the rear seat on top as shown in 5, and then lifting up the rear seat boards which are hinged at one side. The shelf in the back is cut away enough to allow the door of the wardrobe to open.



Inside View

In the case of a car having no excess of wheelbase, this plan would probably be the best, as the construction shown, if adapted to any but a long wheelbase, would involve much unsightly overhang, that with a dummy touring trunk would not have as awkward an appearance. The illustration and description is from Cooper's Journal.

REMOVING SCALE

Scale from gray castings can be removed by placing the piece in a pickle made of 2 per cent. of sulphuric acid and leave in two hours, then rinse in water, and scrub with brush.

NEW ZEALAND NATIONAL ASSOCIATION

The conference of New Zealand coach builders and wheelwrights held at Wellington during Easter week was a distinct success. As a result of the meeting an association covering the trade of the whole Dominion is now in existence, with leading members of the trade at the head of affairs. The conference, after unanimously passing a resolution bringing the new association into existence, proceeded with the discussion of a business sheet, containing a number of papers and addresses on subjects appertaining to the trade. The proceedings lasted over Tuesday, March 25, the opening day, to the evening of the following Thursday, when a successful banquet tendered the visiting delegates by the coach builders of Wellington brought the proceedings to a close.

Mr. H. Childs, president of the Taranaki Association, moved that those present form themselves into an association to be known as "The Carriage Builders', Wheelwrights', and Motor Car Builders' National Association of New Zealand." This was unanimously agreed; after which election of officers took place as follows:

President, Mr. John Bett (Palmerston North); vice-presidents, Messrs. J. Ormiston White (Dunedin), and F. Rouse (Wellington); Hon. secretary and treasurer, Mr. G. Dash (Waimate); executive committee, Messrs. E. James (Blenheim), T. Childs (Stratford), W. Atkin (Auckland), Whittaker (Hamilton), G. Faulkner (Napier), and one member to be still elected to represent Christchurch. Mr. Brayshaw, having declined nomination owing to his intention to take up agricultural pursuits, was elected a life member of the association.

The following papers were read: "Credit and Terms," by John Bett; "Combination and Concentration," by H. Hurrell; "Fire Insurance in the Carriage Trade for the Dominion," by Geo. Dash; "The Practice of Price Cutting," by E. C. Harvie; "Organization," by T. Hurrell; "The Value of Associations to the Trade," by J. Whittaker.

Census Statistics of the Carriage and Wagon Industry

Statistics in detail of the carriage and wagon industry of the United States for 1909 are presented in a bulletin soon to be issued by Director Durand of the Bureau of the Census, Department of Commerce. It was prepared under the supervision of W. M. Steuart, chief statistician for manufactures.

The 5,492 establishments in both branches of the carriage and wagon industry in the United States gave employment in 1909 to an average of 82,944 persons, of whom 69,928 were wage earners, and paid $45,555,126 in salaries and wages. The total cost of materials used in 1909 was $81,951,288, which was equal to about half (51.3 per cent.) of the total value of products ($159,892,547) while the value added to materials by manufacture was $77,941,259. A considerable part of the value of products reported represents receipts for repair work.

Of the 5,492 establishments, 4,870, or 88.7 per cent., in 1909 were engaged primarily in the manufacture of carriages and wagons, and of the total value of their products, $125,366,912, or 78.4 per cent., was contributed by this class of establishments.

The carriage and wagon industry has existed in this country since early colonial times, and its growth up to the census of 1904 about kept pace with the increase of population. The advent of the automobile, and later of the motor truck, has had a decidedly retarding influence on the industry. Many establishments reported at censuses prior to 1909 or 1904 as manufacturing carriages and wagons have since turned wholly or in part to the manufacture of automobiles and have been classified under the automobile industry.

The value of products reported for 1909, while more than double that in 1879, was only 15.6 per cent. in excess of that in 1899. The greatest increase in value of products, $43,876,665, or 58.4 per cent., was between 1879 and 1889. There was a moderate increase from 1889 to 1904, but only a very slight increase from 1904 to 1909. Between 1899 and 1909 there was a decrease in number of establishments and of wage earners.

Ohio Ranks First

The carriage and wagon industry is well distributed throughout the United States, establishments being reported for all states except Nevada. In 1909, as in 1904, Ohio ranked first in respect to both value of products and value added by manufacture, while in 1904 it ranked first in number of wage earners also. Indiana ranked second as to value of products in both years, and first as to number of wage earners in 1909. Most of the states held the same, or practically the same, rank in respect to value added by manufacture in 1909 as in respect to value of products, North Carolina and California being the most conspicuous exceptions. Illinois, which ranked third in importance, as measured by value of products, in 1909, showed a more rapid development in the industry during the period from 1889 to 1909 than any other of the leading states, the number of wage earners increasing 34.7 per cent. and the value of products 87 per cent. Higher percentages of increase during the period are shown, however, by some of the states of less importance in the industry, particularly Arkansas.

The average number of persons engaged in the industry as a whole during 1909 was 82,944, of whom 69,928, or 84.3 per cent., were wage earners; 8,844, or 10.7 per cent. proprietors and officials, and 4,172, or five per cent., clerks—a class which includes other subordinate salaried employes.

Of the 5,492 establishments reported for 1909, only 13 manufactured products valued at $1,000,000 or over. In 1904 there were eight establishments of this class. Such establishments, however, reported 15 per cent. of the total value of products in 1909 and 9 per cent. in 1904. None of the other groups reported as large a percentage of the total value of products in 1909 as in 1904.

Establishments whose product exceeded $100,000 and was less than $1,000,000 in value represented only 5.4 per cent. of the total number of establishments, but reported 45.7 per cent. of the total value of products in 1909. On the other hand, the small establishments—that is, those manufacturing products valued at less than $20,000—constituted almost four-fifths (79 per cent.) of the total number of establishments, but the value of their products was less than one-fifth (17.3 per cent) of the total.

The average value of products per establishment increased from $27,893 in 1904 to $29,114 in 1909, and the average value added by manufacture from $14,019 to $14,192, but the average number of wage earners per establishment shows a decrease from 13.9 in 1904 to 12.7 in 1909. In the carriage and wagon branch of the industry in 1909 the average value of products per establishment was $25,743 and the average number of wage earners was 10.8. The corresponding figures for establishments making primarily carriage and wagon materials were $55,507 and 28.

Fewer Vehicles Manufactured

The number of complete vehicles of all classes manufactured by the establishments in the industry increased from 1,594,465 in 1899 to 1,711,529 in 1904, but decreased to 1,519,782 in 1909, the decrease for the decade being 4.7 per cent., and that for the five-year period 1904-1909, 11.2 per cent. The value of the vehicles manufactured, however, was somewhat greater in 1909 than in 1899.

Between 1899 and 1904 the aggregate number and the value of family and pleasure carriages manufactured increased somewhat, but the number in 1909 was 8.4 per cent. less than that in 1899 and the value 6.9 per cent. less. Of the family and pleasure carriages only those with two wheels showed an increase in number during the decade.

The aggregate number and value of wagons manufactured increased materially from 1899 to 1904. The number, however, decreased between 1904 and 1909, although the value increased somewhat. The number of wagons made in 1909 was 3 per cent. greater than the number made in 1899, and the value 28.5 per cent. greater; as compared with 1904, however, there was a decrease of 8.7 per cent. in number, and an increase of only 7.4 per cent. in value.

Wagons (business, farm, government, etc.) were made in 1909 in every state in which the carriage and wagon industry was conducted. The four leading states, Wisconsin, Indiana, Illinois, and Pennsylvania, together reported the manufacture of 298,586 wagons, or 50.8 per cent. of the total. Of the 31 states for which the numbers are given separately, 17 show an increase between 1899 and 1909 in the number made, and 14 a decrease. Illinois shows the greatest absolute increase and Michigan the largest decrease.

The number of sleighs and sleds manufactured shows a movement similar to that of carriages. It increased from 1899 to 1904, but decreased during the next five years, and in 1909 was 13.8 per cent. less than in 1899. While the manufacture of sleighs and sleds was reported in 33 states, 71.6 per cent. of

the total number were made in four states, Michigan, Wisconsin, Minnesota, and New York.

The following table gives the figures in detail:

Carriages and Wagons and Materials

	Number or amount			Per cent. of increase*	
	1909	1904	1899	1899-1909	1904-1909
Number of establishments ..	5,492	5,588	6,792	—19.1	— 1.7
Persons engaged in the industry	82,944	90,751	(†)	....	— 8.5
Wage earners (average number)	69,928	77,882	73,812	— 5.3	—10.2
Capital ..	$175,473,728	$152,344,657	$128,961,660	36.1	15.2
Wages ..	37,594,919	38,362,679	33,565,313	12.0	— 2.0
Value of products	159,892,547	155,868,849	138,261,763	15.6	2.6

*A minus sign (—) denotes decrease. Where percentages are omitted, comparable figures can not be given. †Comparable figures not available.

THE COWLES DIAMOND JUBILEE

June 10, in New Haven, C. Cowles & Co. emphasized 75 years of business life—a diamond jubilee of trade—by a banquet at the Hotel Taft. We give an account of it from a page of the Times-Leader of New Haven.

C. COWLES
Founder of Business

The vehicle trade will take a sympathetic interest in this celebration because "Cowles" is a name known and respected from lands' end to lands' end in the business.

It was very unusual because of the fact that men of the Cowles family have been at its head from the beginning until the present day and it was unique because it included among the celebrators the heads of the firm, the men at the head of the departments, men who work all day in the shop, guests and friends from other states and the wives of those who have most to do with the management of the company's affairs.

Lewis C. Cowles, president of the company, was toastmaster.

During the evening Mr. Cowles was presented with a beautiful gold watch, a complete surprise. It evidenced the cordial good will of his associates.

The first speaker was Governor Baldwin, who has been a director in the company for 19 years.

Governor Baldwin spoke in part of the difference between New Haven when the C. Cowles Company started and the present day, recalling the old Farmington canal and the first railroad to Hartford and the time it took to travel on those lines. It was in 1838 that the bicentennial anniversary of the foundation of New Haven was celebrated and a medal struck in commemoration of the event.

All this took place in the year that C. Cowles & Co. launched their new enterprise devoted to the manufacture of carriage hardware. At that time the population of New Haven was only 12,000 and its banking capital only about a million and a half. In introducing the governor Mr. Cowles said the company was particularly fortunate in the personnel of its directors and in the fact that Governor Baldwin had been its friend, adviser and financial backer in days when the shadows of business depression were upon it.

The governor himself referred to the present prosperity of the company with enthusiasm, in which all concerned heartily shared.

Governor Baldwin also related many interesting facts of the history of C. Cowles & Co., and how it had stood the test for 75 years through several financial panics.

Hon. H. G. Newton said: It was a memorable occasion—that fiftieth anniversary of the establishment of this business—the seventy-fifth affords no cause for despondency or complaint. The business of C. Cowles & Co. is being conducted honestly, diligently and successfully. It is a little more than 30 years since I became a director. My first special business was the revision of the by-laws. I have since been counsel for the company, have advised as to its affairs, and have been more conversant with its operation than any director not an officer.

Let me, therefore, speak of its history, especially of its directors and officers.

Thirty years ago the name of Chandler Cowles, the C. Cowles of C. Cowles & Co., and the founder of its business was frequently mentioned. Charles L. English, one of the seven directors when I came upon the board, at the fiftieth anniversary spoke highly of his character and attributed the success of the company to the sterling character of its owners and managers.

Previous to 1851, Chandler Cowles had conducted the business with partners. For the next four years he conducted it in his own name, and then, in 1855 the corporation of C. Cowles & Co. was organized; the stockholders being Chandler Cowles with six-tenths; John M. Babcock with three-tenths, and Ruel P. Cowles, the father of the present president, with one-tenth of the capital stock.

Those three stockholders became, of course, the directors and there is no record of any other stockholders' meetings during the succeeding ten years of the life of Chandler Cowles. After that time stockholders' meetings were held annually.

In 1866 the directors elected were John N. Babcock, Ruel P. Cowles and Luman Cowles. Luman Cowles was a brother of Chandler and Ruel P. Cowles.

The same directors were elected each year until 1873, when, Luman Cowles having deceased, Edward L. Cowles, son of Chandler Cowles, was elected in his place. The same directors were elected in 1874.

In 1875 F. L. Buckingham was added, and in 1876 the directorate continued the same.

Chandler Cowles was president until and including 1865; then John N. Babcock was president and Ruel P. Cowles secretary until and including 1876.

F. L. Buckingham was treasurer from 1873 until 1876, after which time he became secretary for several years. In 1877 the directors were Ruel P. Cowles, Charles L. English, Edward L. Cowles and George B. Rich.

In 1878 E. N. Shelton and Daniel Trowbridge became directors in place of George B. Rich; there being then five directors.

In 1879 and 1880 the directors were Charles L. English, S. E. Elmore, of Hartford; Ruel P. Cowles, Frederic L. Cowles, son of Ruel; Daniel Trowbridge, E. N. Shelton, of Shelton, and Norman A. Cowles, nephew of Chandler Cowles.

In 1881, General Edwin S. Greeley and Morris F. Tyler took the place of Daniel Trowbridge and N. A. Cowles.

In 1882, when my acquaintance with the board began, the directors were Ruel P. Cowles, Charles L. English, E. N. Shelton, E. S. Greeley, Morris F. Tyler, S. E. Elmore and myself.

The board remained the same till 1890 when Charles L. English resigned, much to his associates' regret, and Edward H. English took his place.

In 1891, June 19, Ruel P. Cowles died, and his son, Frederic L. Cowles, took his place.

In 1894 Edward N. Shelton died, and Richard E. Rice sold his stock, and Pierce N. Welsh and Simeon E. Baldwin became directors.

In 1898 Edward H. English resigned and Louis C. Cowles

took his place. Albert S. Holt and George T. Bradley were added to the board.

In 1904 Frederic L. Cowles resigned and E. Ely Garrison took his place.

In 1909 Pierce M. Welch died.

The present directors in the order of their term of service are: S. E. Elmore, H. O. Newton, S. E. Baldwin, L. C. Cowles, George T. Bradley, Levi P. Yale, C. M. Costello, C. E. P. Sanford.

F. C. Lum and A. C. Snell have also been directors.

The presidents of C. Cowles & Co. have been Charles Cowles, 1855-1865; John N. Babcock, 1866-1876; Ruel P. Cowles, 1877-1891; Frederic L. Cowles, 1891-1903; E. Ely Garrison, 1904-1908; Louis C. Cowles, from 1909.

The secretaries have been John N. Babcock, 1833-1865; Ruel P. Cowles, 1866-1876; F. L. Buckingham, 1877-1882; F. L. Cowles, 1882-1904; F. C. Lum, 1904-1908; F. M. Ruwet until his death in 1912.

The treasurers have been Chandler Cowles, 1855-1765; John N. Babcock, 1866; Horace B. Dibble, 1867-1872; F. L. Buckingham, 1873-1876; R. P. Cowles, 1877; George E. Spare, 1878; H. M. Welsh, four months in 1879, then R. P. Cowles, S. E. Elmore, in 1880-1882; Thomas T. Welles, 1883-1894; Louis C. Cowles, 1905-1907; E. Ely Garrison, 1908; C. M. Costello, from 1909.

In 1889 it was found that the premises on Orange street where the business had been conducted was inconvenient; the capital stock was increased, and in 1890 the new premises on Water street were finished and occupied.

A year after the company mourned the loss of its president, Ruel P. Cowles, which was followed by the panic of 1893, and the many years of depression which succeeded.

THE TRACKLESS TRANSPORTATION PROJECT

Formation of Trackless Transportation Company under Massachusetts laws, with $500,000 7 per cent. cumulative preferred and $950,000 common stock is first step in the development of an enterprise which it is believed has important possibilities in the transportation field.

The vehicles of transportation are trolley cars, which although dependent for power upon the usual overhead feed line, run on the highways rather than on steel rails.

While this is new to this country it has been in successful operation for several years in England, Scotland, Germany, France, Belgium, Switzerland, Austria-Hungary, Italy, Norway and South and East Africa, where under all conditions of climates and roads results have been most satisfactory. Some of the lines are owned and operated by municipalities, as in Dundee, Scotland, an interesting feature of the foreign situation being that in many cases where objection was made to the ordinary trolley because it necessitated tearing up the highways, the trackless trolley has been permitted to operate.

The chief advantages over those now in use are the lower cost of construction and material savings which can be made in operating. Average cost of construction for trolley lines in Massachusetts is $40,000 per mile, against $10,000 for the trackless, while average operating cost of Massachusetts trolleys is 40 cents per mile, against 12 cents for the new method.

It is not the intention to operate lines which shall be competitive, but rather as feeders in favorable districts now without such facilities and which cannot be economically reached by other systems.

The Trackless Transportation Company is a holding company and subsidiaries are to be formed to build and operate in various districts as franchises are secured, negotiations for which are now in progress. Manufacturers in various parts of New England are already looking into the feasibility of using the cars for transportation of freight between warehouses and terminals.

T. W. CONNOR PRESIDENT DITZLER COLOR CO.

At the March meeting of the directors of the Ditzler Color Co., of Detroit, T. W. Connor was selected as president of the company. Mr. Connor, who recently purchased an interest in the company, was formerly director of sales of the Acme White Lead Co., of Detroit, and is well known in the trade as a man of push and energy.

Mr. Ditzler retains an interest in the company and will serve as director and vice-president, and, outside of looking after details, will be as active as before in the company's affairs.

HOW TO BUY

Low prices paid for materials are not necessarily exponents of a purchasing agent's efficiency. The man who can discriminate and buy the right thing at a fair price is the kind of man that lasts in this period of competition and exacting requirements.

CASEHARDENING

There are five factors which determine the result of the carbonizing operation, the nature of the steel having no influence on the speed of penetration of the carbon, but unless even and uniform heat be maintained would affect the final result of the operation. Steel containing from .012 to .015 per cent. of carbon is given the preference in every-day practice and usage where it is desired to have a hard shell outside for wear and a tough core or center to withstand the shock and strain.

The factors that influence the final result are: First, the temperature of the furnace; second, the time the piece is submitted to the carbonizing process; third, the nature of the carbonizing material; fourth, the heat treatment which follows carbonizing; fifth, the nature of the steel, the latter being more in evidence if alloy or high carbon steel be used, in which case heat or length of time affect the final result.

Most of the alloyed steels are made in special grades for carbonizing, dependent to some extent to what use it is intended to put the parts. To illustrate—vanadium steel that gives best results for crank shafts, connecting rods and other moving engine parts is composed of .025 to .035 carbon, .040 to .050 manganese, 1 per cent. chromium, .016 to .018 vanadium; while the best carbonizing steel has .012 to .015 carbon, .020 manganese, .030 chromium and .012 vanadium.

Good and even carbonizing depends on the degree of the temperature maintained during the heating process.

The temperature in carbonizing ranges between 1,300 and 1,800 degrees and should never be below.

PUBLISHER'S STATEMENT

Statement of the ownership, etc., of The Hub, published monthly at New York, N. Y., as required by the Act of Congress of August 24, 1912.

Name of	Post-office Address.
Editor, C. H. E. Redding,	24 Murray St., New York City.
Managing Editor, none.	
Business Manager, G. A. Tanner,	24 Murray St., New York City.
Publishers, Trade News Publishing Company,	24 Murray St., New York City.
Owners, Trade News Publishing Company,	24 Murray St., New York City

(If a corporation, give names and addresses of stockholders holding 1 per cent. or more of total amount of stock.)

G. A. Tanner, 24 Murray St., New York City.
Joseph H. Wright, Broadway and 67th St., New York City.
Geo. W. Hills, Fairfield, Conn.

Known bondholders, mortgagees, and other security holders, holding 1 per cent. or more of total amount of bonds, mortgages, or other securities: None.

TRADE NEWS PUBLISHING CO.,
(Signed) G. A. Tanner,
Business Manager.

Sworn to and subscribed before me this 30th day of April, 1913.
J. R. FRITH,
Notary Public.

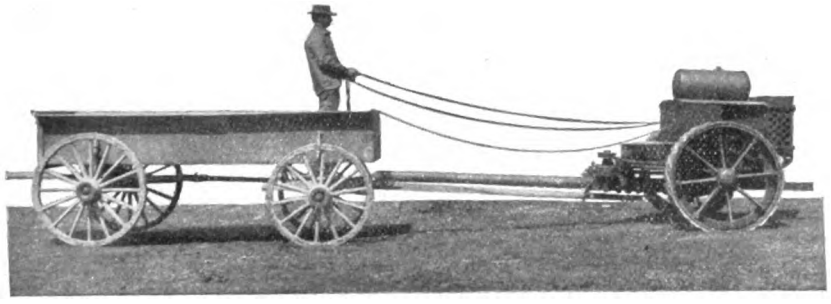
Commission expires March 30, 1914.

THE DETROIT TRACTOR

The Detroit tractor made by the company of that name, is the outgrowth of efforts on the part of its designers to produce a strictly one man outfit that would be adaptable to the requirements of the small farmer as well as the large one and would function like two or more teams of horses.

In developing this tractor fifteen years of experiment and thousands of dollars were expended in field work. The final details of construction were worked out by an engineer who has devoted many years to designing machine tools and who now is one of Detroit's foremost automobile engineers. It is an all steel tractor.

This tractor can be used to haul heavily loaded wagons or carts. It is especially useful where the time of loading and unloading is important. In a lumber yard, for instance, the



Detroit tractor is changed from an empty wagon to a loaded one without delay, thus getting results at the lowest cost. It is used where the load to be hauled consists of chemicals, ice cream in brine, ice, garbage, etc., where the expensive automobile truck would be ruined by the drippings from the load.

The control is effected by means of three reins. In hilly country a fourth rein is added to operate the brake. Driving the tractor is almost the same as driving a horse. Any good teamster can drive it at first trial. The steering is accomplished by a pull on either the right or the left steering rein which connects the engine by a special friction clutch to the steering gear and the tractor is turned by the engine's power. A very slight pull is all that is necessary to make a complete turn. A pull on both steering reins simultaneously, releases the main clutch in the engine flywheel thus stopping the tractor instantly. The third rein is used only to shift the gears from neutral to forward or back.

The rein control is original. It is very simple and gives perfect control over the machine.

MR. RONINGER'S ASSISTANTS

Wm. H. Roninger, chairman of the entertainment committee of the Carriage Builder's National Association, has appointed the following assistants to help him. It will be their endeavor to make the St. Louis convention the most jolly and successful meeting in the history of the association.

Reception Committee—Geo. B. Ogan, chairman; Thomas Price, C. N. Waterhouse, A. T. Stevens.

Entertainment Committee—L. A. Geserich, chairman; Russell E. Gardner, Jr., E. C. Sullivan, H. P. Hubbell.

Finance Committee—Geo. Hoffman, chairman; P. E. Ebrenz, Norman B. Champ, J. A. Maroney, Geo. H. Schelp.

Advisory Committee—P. E. Ebrenz, W. H. Roninger.

COLUMBIA TIRE FACTORY FOR COLUMBIANA

Promoted by the owners of the L. & M. Rubber Co., the Columbia Rubber Co. has been organized in Columbiana, O., and expects to have a large factory there erected and tires on the market by July 1. The officers of the company, which is capitalized at $1,000,000, are as follows: E. L. Henderson, president; A. E. Albright, secretary; J. H. Edwards, treasurer.

PACKING AUTOMOBILES ON CARS

In packing the car, empty the tanks and disconnect the batteries. If electric cars, remove batteries. Place the vehicle in the truck parallel with the sides of the car; and see that the front wheels are in line with the back wheels. Wrap the lower third of the tires with burlap to prevent chafing; and set the brakes.

Fasten each wheel to the floor with a strong band of canvas or several layers of burlap of the width between two spokes. Secure the band to the floor on each side of the wheel with blocks 2 x 4 x 12 inches. Place these blocks parallel with the wheel, using plenty of nails or spikes so that the band cannot pull loose.

Use blocking in front and behind each tire one-third as high as the diameter of the wheel, and at least one inch wider than the tire. Fasten this securely to the floor and tie together with 1 or 2-inch timber from block to block. Have the blocking of sufficient width so that the boards used to tie the blocks together will clear the tire at least ½ inch on each side.

The tires should be tightly inflated; and the edges of the boards and blocks next to the tire should be rounded or bevelled, so that if the tire should become deflated or in any way come in contact with the boards or blocking, it will not be so liable to chafe. Place covering over the vehicle to keep off dust. Also remove lamps to prevent damage to them.

Railway trucks should be carefully inspected to see that they are fit for loading. If there are nails or other projections in the floor or sides they should be removed. If the roof appears to be leaky, or its fastenings for doors, both end and side, are not complete or ample, it should be refused and one suitable for loading demanded.

MARKET FOR AMERICAN MOTOR CARS AND TRUCKS

There should be a good market in Plauen, Germany, for American motor cars if they are properly introduced. The roads are in excellent condition during the entire year. There are many manufacturers in this vicinity who are wealthy and well able to afford and maintain motor cars. Approximately 100 to 150 motor cars and trucks are sold yearly in this district and the demand for motor trucks is increasing.

A 30 horsepower touring car selling for $1,000 to $1,200, with attractive appearance and finish, would no doubt find a good market if represented by a good active agent. It is also essential to have a repair shop, well equipped, with duplicate parts to insure immediate repairs.

SPOKE AND RIM PLANTS CONSOLIDATE

The N. C. Blanchard Co., of Crab Orchard and Spring City, has decided to consolidate the two plants and locate in Harriman, Tenn., for the purpose of manufacturing spokes and rims for wagons, with a capacity for employing about 60 men. Their plant at Spring City was recently destroyed by fire. N. C. Blanchard resides in Chattanooga, and his father, F. S. Blanchard, will make his home in Harriman and conduct the operations of the new plant.

Smith Shop

HINTS FOR THE SMITH SHOP

In these days of team work, efficiency and all the attractive fads we fail to consider the man who is plugging away at his forge and anvil in the good old fashion, although there are many of him yet in the land, and his place as a repairer of ironwork will not be empty. We find in our Australian contemporary some pointers that will just fit this class, and we feel that we are doing the right thing in putting such hints before them.

The first is a tool for bending flat straps and clips. The drawing shows the idea. If made strong it may be used for bending 6 x ½ flat iron, or even wider material. To make it take a piece 2 in. square about 3 ft. 6 in. long, as in A, Fig. 1. By welding pieces on at B and B make it the shape shown, so that it will be wide enough to take a wide piece of iron. Now make two straps out of 2 x ½ in. iron and punch a cotter hole and drill two set screw holes as shown in C.

Now make a number of clips the shape of Fig. 2, wide enough to clip over the tool at D. These clips are made of various thicknesses of iron, so that they will accommodate different sizes of straps which may have to be bent. The corners must also be worked up very square, as at E. If you have a number of straps to bend, say 3 inches inside, take the 3 in. clip and place it on D, Fig. 1. Now place the strap in position on the tool, as shown by the dotted lines, and after placing a packing piece, Fig. 3, on top, drive the two cotter

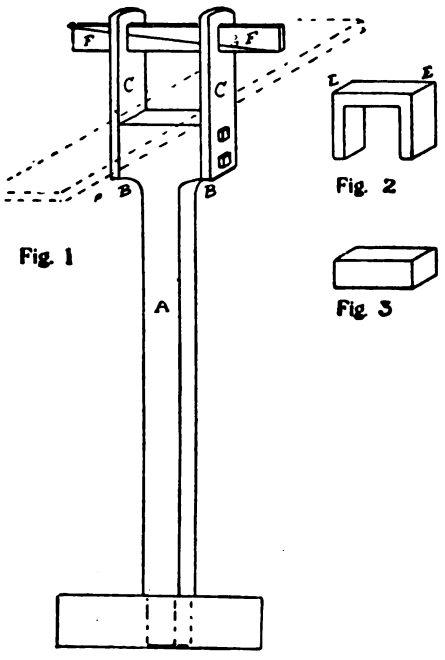


Fig. 1

Fig. 2

Fig. 3

pins FF in tightly and then proceed to bend the straps.

This tool is fixed in the swage block, and is clear of the anvil. It is made the height convenient for working at. It is very easily adjusted to take any size of iron and will in one heat bend any width of strap. I have bent hundreds of different size straps in a tool like it from 1½ x ¼ in. up to 6 x ⅝ in., and must say it is the best I have ever used.

The amount of iron to cut for a ring is shown in the next illustration. To find how much iron it takes to make a ring or band is to add one thickness of the iron to the inside diameter of the ring and multiply by 3 1/7.

Take Fig. 4 as an example. The ring is 12 in. inside diameter, and the iron is 2 in. thick. Now when bending this bar of iron to the shape of a ring the inside edge of the iron contracts and the outside edge draws in the same proportion as the inside contracts. Now it stands to reason that the only placid portion is the center of the bar, as shown by the dotted line

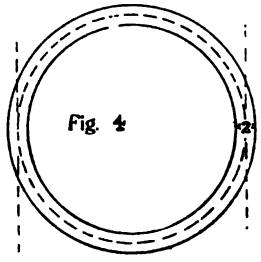


Fig. 4

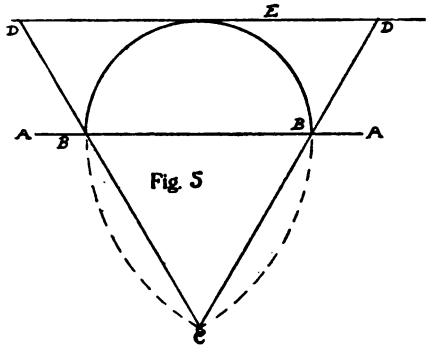


Fig. 5

in the sketch. If you take this neutral diameter, which is 14 in., and multiply by 3 1/7 it will give you 12 x 2 x 3 1/7, which equals 44 inches.

As some smiths have a horror of figures, another method may be used. Draw a line AA to describe a semicircle BB, the radius of which must be the neutral diameter of the ring wanted. Now with radius BB mark the point C. Now run lines from C through BB, meeting a line which runs parallel to AA and touches the top of the semicircle at E. This line DD will be the exact length of iron to cut off to make half the ring. Double it for the whole ring, and if it has to be welded, one thickness of metal must be added for the weld.

IDEA FOR BRAKE LEVER

The drawing reproduced herewith shows an improvement in brake gear on vehicles having to traverse hilly country under heavy loads. It has been designd with the object of exerting an increasing brake pressure on the drums, without regard to the limitations of the usual brake-lever quadrant.

A glance at the drawing will make the construction clear. When putting on the brake, the lever is pulled in the usual manner. This actuates a pawl, which, in turn, works the rack, shown on the left-hand side of the drawing. The brake coupling rod is bolted in the ordinary way to the lug cast on the rack at the lower end. A spring-controlled safety pawl is fitted, and this engages with the rack, and prevents any inopportune releasing of brake pressure. The speed lever can be worked across the quadrant as often as may be required to arrest the speed of the vehicle.

To slack off the bands from the drums, it is necessary to

depress the pawl lever. This lifts the upper pawl clear of the rack, and the toggle lever, shown in section, is then knocked out of engagement by a reverse movement of the main handle.

In order that the brake may not be inadvertently taken off, a collar, shown by dotted line towards the lower end of the pawl rod, is so located that, until the brake-lever pawl is taken out of gear, this safety band drops on to a boss on the quadrant. This renders it impossible to withdraw the safety clutch until the band is lifted clear of the boss.

The designer claims that it is no more difficult for a driver

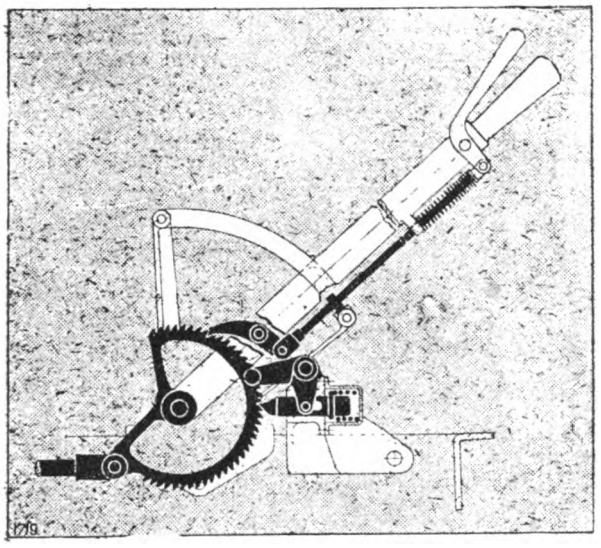
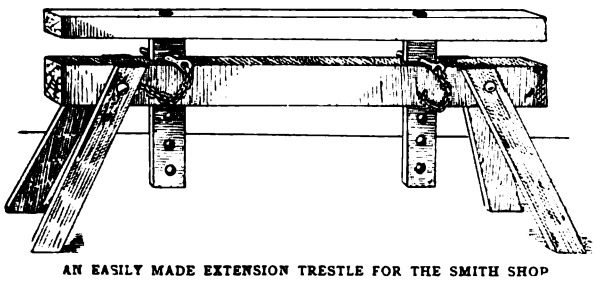


Diagram of the brake-lever adaptation

to actuate this brake lever than it is for him to work the ordinary standard type brake fitted to a commercial vehicle. It follows, of course, that there is no intention of supplying the driver with sufficient leverage to damage the brake drums. There are many occasions when vehicles are sent out with the brake lever bearing hard on the edge of the quadrant, when full pressure is being applied. In such a case, should control be lost when descending a hill, disaster is almost inevitable. The construction here described is designed to reduce the possibility of such an accident's occurring. The pressure may be applied gradually, or in a series of jerks, and the brake band, or shoe, can be used until quite worn out.

EXTENSION TRESTLES

A wood worker has designed an extension trestle for use in the body shop, which he says meets all requirements cheaply, and can be easily made in the shop. He sends a sketch to the American Blacksmith, and a description that may be of value to small shops where repairing and some new work is a part of the daily routine.



AN EASILY MADE EXTENSION TRESTLE FOR THE SMITH SHOP

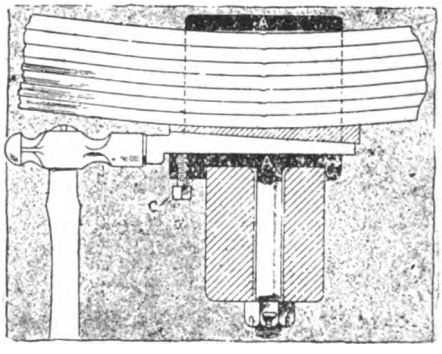
Lumber for the main part of the trestle is a piece of 3 x 3½ inch stuff 3 feet long. The legs which are 1 x 2½ inches and 2 feet long are let into this and bolted on. The crosspiece for the extension part is 2 x 2½ inch lumber, 3 feet long. The standards for raising and lowering the extension crosspiece are of 2½ x 1 inch flat stock and 2 feet long. Before fastening the standards in the extension crosspiece a number of holes are drilled in the standards, so that by means of the pins shown, the extension section can be held at any desired height within the range of the machine.

The standards are fastened in the extension crosspiece by forging down the end of the standards for about two inches at one end. The ends are then threaded; holes are then bored in the crosspiece at the proper points. Now with washers at the proper points the standards are firmly bolted to the crosspiece. The square holes or slots in the main part of the trestle should be of such size as to allow the standards to move up and down easily. If the ½-inch holding pins are attached to the trestle with small chains they will not become misplaced.

GERMAN WEDGE SPRING CLIP TIGHTENER

Spring making in Germany has been reduced to a fine art. Good material for springs is regarded as necessary to entire success. But if the springs are not properly clamped to the bed, it is more than possible that good material, excellence of workmanship of the spring maker, and proper proportioning of the springs will do very little good. It is said of springs that, unless they are firmly clamped to the bed they will fail in exacting service.

The German railway engineers, having much experience with springs, clamp them somewhat after the fashion illustrated. Some automobile engineers are following along these lines also. Between the axle and spring are three members: First, a box A resting on the axle as secured thereto by a center bolt passing through the axle vertically; second, a plate with a curved contour bearing against the bottom leaf of the spring, and, third, a wedge or way between these two parts, so designed that by tapping with a hammer the fit of the spring within its



clips can be tightened and held at any tension by the set screw C.

The above points are of special interest in view of the trouble that has been found in some cars from breaking springs due to the condition that the spring pad did not have the same curvature as the spring. The fact that the curved spring rested upon the flat pad gave rise to the situation that a mere line contact was obtained in place of the flat seat. It is impossible to keep the clips tight where such condition exists and, as a result, the springs work the clips loose and at the first heavy rebound they break. Some makers have placed a fibre block curved to the shape of the spring beneath the lower leaf and have obviated the difficulty in this way. Spring clips are especially apt to come loose in new cars.

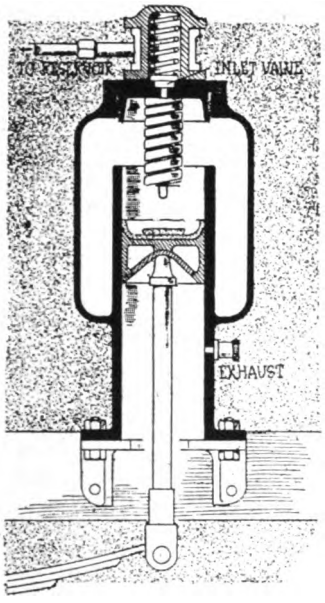
A NEW SUSPENSION

The troubles clustering about comfortable spring suspension have caused a lot of experiment. A late one of English origin is described in The Motor and the illustrations will help to an understanding of it. In place of being a makeshift it is a complete principle of suspension that looks very sane. It has

been tried out for two years, it is written, and is now seeking the public's favor. It is named the Cowey.

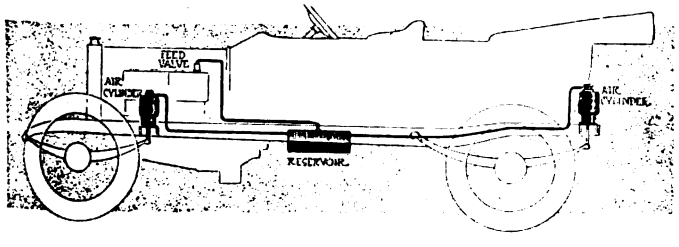
The device is not so much an auxiliary fitting as it is a complete suspension system. It consists of four air cushions applied to the rear end of all four leaf springs, as shown in illustration, and supplied with compressed air from a small reservoir located on the chassis. The feature of the system is that the pressure in each of these cushions or cylinders is made to vary exactly with the load borne by the particular corner of the car at any time.

A section through one of the air cylinders shows the method of attaching to the chassis and also the connection existing



between the device and the end of the spring. Each unit consists essentially of a plain cylinder vertically arranged on a bracket fixed to the frame and opening at its upper end into a compression space having the appearance of an ordinary water jacket. The lower end is open to the air. A piston provided with a well-oiled leather cup on its upper surface, constituting an absolutely air-tight joint, is free to slide within the cylinder. The piston rod or compression member between the piston and the spring is shackled only at its lower end, the other end simply resting in the recessed under surface of the piston.

At the top of the cylinder casting a spring-loaded inlet valve is in direct communication through small copper piping with the air reservoir. The plunger rod of this valve extends down-



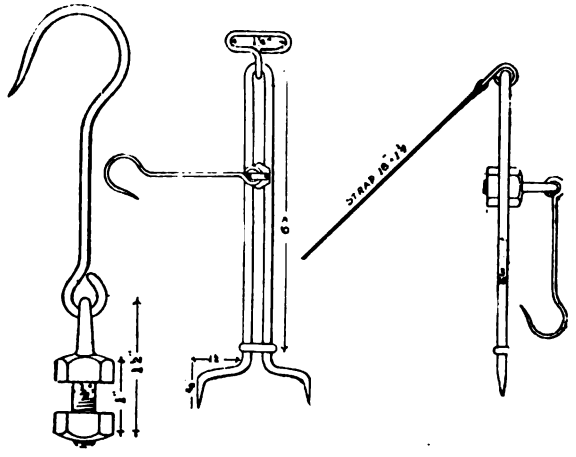
ward toward the piston and is surrounded by a buffer spring, the lower end of which meets the piston when the latter is in its highest position. A small hole drilled in the cylinder wall, and forming an exhaust port, determines the lower limit of the piston stroke.

The air reservoir is supplied direct from a simple non-return valve fitted to one of the valve caps of the engine. By this means the pressure of air in the tank is maintained so long as the engine is running. This pressure is such that the automobile is supported on the four air cushions with the pistons occupying a normal position.

When an inequality of the road surface is met the piston is caused to move up or down and if the bump is severe enough the upper surface of the piston either strikes the plunger rod of the inlet valve, or, on the other hand, drops low enough to uncover the exhaust port. In running the car with the rear seat empty, then, immediately a person enters, that side of the car on which he is seated sinks a little over the piston. This action brings the upper surface of the piston near to the valve rod so that with each ensuing lump in the road surface a small quantity of air enters until the piston is again occupying its normal mid-stroke position. When the passenger gets out, the pressure in that particular cylinder, being too great, raises that corner of the car so that the piston approaches its lowest position in the cylinder. The first inequality then encountered frees a portion of the air through the exhaust port, and so allows the piston to return to its normal position.

CUSHION HOOKS

A pair of cushion hooks as are here illustrated should be in the kit of every trimmer. They are useful for lots of other things, such as making up seaming lace, etc., and with them you can make a much better and neater job than by trusting to the hands alone. The drawings will illustrate the idea, says Australian Coachbuilder, which has many practical ideas of this kind. For a pair all that is wanted are two pieces of 3/16 iron, two loops, two ¼ bolts, four nuts, two hooks, and straps. Get the smith to bend a piece of 3/16 square iron to the shape shown in the front view, making it the measurements given, pointing both ends, so that you can drive into bench; also a ring with a twisted loop, for the top to hold strap. Slip this on, and then have another loop for bottom, as it helps to keep the bolt from slipping down. Then get a quarter-inch bolt and two nuts and cut off at 1½ inches from screw



end. File a piece off each side, so that it will slide up and down, still leaving the thread for your nuts. Flatten one end, at right angles to where you have squared the bolt, and punch a hole for hook to fasten. Get the hook made the shape required of a piece of fine steel with an extra sharp point, as it will have to go through several thicknesses of leather. Fit it on the bolt, then get one of the nuts and screw on the bolt up to one inch from end. Put in between the two uprights and screw on the other nut. Sew a strap on to the loop at top and punch holes at intervals for your awl to go through when fastening to the bench. These cushion hooks will be found high enough even for the front of a motor leather strap, fastened on to a piece of wood, inasmuch as you can slide your hooks up and down to whatever size you require. Of course, the height can be increased, but 6½ inches wil lbe found high enough even for the front of a motor cushion, which is seldom made higher than five inches.

HORSE SHOW DATES

Following are the dates for the principal annual horse shows in the different cities of the United States for 1913: Leesburg, Va., June 4, 5; Lancaster, Pa., June 5-7; Plainfield, N. J., June 5-7; Upperville, Va., June 12, 13; Springfield, O., June 18-20; Chagrin Valley, Cleveland, June 26-28; Culpeper, Va., July 4, 5; Manassas, Va., July 23, 24; Orange, Va., July 30, 31; Long Branch, N. J., July 30-Aug. 2; Charlottesville, Va., Aug. 6, 7; Berryville, Va., Aug. 12-14; Warrenton, Va., Aug. 20, 21; Newport, R. I., Sept. 1-3; Syracuse, Sept. 8-13; Rochester, Sept. 16-20; Ogdensburg, N. Y., Sept. 22-27; Poughkeepsie, N. Y., Sept. 29-Oct. 3; Brockton, Mass., Sept. 30-Oct. 3; Byrn Mawr, Pa., Sept. 30-Oct. 4; Piping Rock, L. I., Oct. 3, 4; Richmond, Va., Oct. 6-11; National Horse Show, New York, Nov. 15-22; Fort Worth, Texas, Nov. 22-29; Chicago, Ill., Dec. 1-6.

HARDY BUGGY CO. RETURNS TO PADUCAH

The Hardy Buggy Co., which moved from Paducah, Ky., to Dallas, Tex., and consolidated with the Brown Buggy Co. a few months ago, has arranged to return to Paducah, and will be ready for business about July 1. The company is exempted from taxation for five years as an inducement to return. Besides the large brick structure which now stands at Ninth and Harrison streets, a larger building will be erected by the buggy company. Twice as much machinery will be returned to Paducah as was shipped to Texas. In addition to making various improvements, the company will employ about 200 skilled hands at its plant. W. T. Hardy is president of the company.

CLAIMS BASIC RIGHTS TO BRIDGED TIRE

Just what bearing a decision of the United States District Court for the Southern District of New York will have upon the manufacture of Motz bridged cushion tires is yet to be determined, but according to the decree of the court the tire is an infringement of patent No. 887,997, which was issued May 19, 1908, to cover a tire of that description; the complainants in the case were Edwin B. Cadwell, Frank Johnston, Frank M. Ashley and the Swinehart Clincher Tire & Rubber Co., of Akron, O., and the nominal defendant was the Rapid Safety Filter Co., of New York City, which used four Motz tires on an automobile which it operated.

The suit was instituted October 8, 1909, and was defended principally by the Motz Clincher Tire & Rubber Co., which is owned by the Goodyear Tire & Rubber Co., and numerous instances of prior patents were cited in the early stages of the case, but little defense proved available when the conclusion was neared. Ashley, who is an assignee of a part of the patent and who is a patent attorney, states that the grant is basic and that other litigation is likely if manufacturers of tires of the now well known Motz type do not make arrangements with the patent holders.

HAZELTINE OFFERS "LOWEST PRICED CAR"

Philip Hazeltine, who is said to have promoted and to be interested in several automobile companies, is the moving spirit in the Gadabout Motor Corporation, of New York, which was incorporated with a capital of $250,000. Not all of its plans are completed, but it is the intention of the company to produce a runabout and delivery wagon, both on the same chassis, at a price which it is confidently asserted "will be lower than anything now on the market."

FEDERAL SKIDS INTO BANKRUPTCY COURT

The Federal Chain & Mfg. Co., of Springfield, Mass., has been petitioned into involuntary bankruptcy. It manufactured a couple of non-skid devices but never cut a very large figure in the industry.

GAS ENGINE FUEL

All grades of gas engine fuel come from one source—crude petroleum. It is obtained from wells in different parts of the world. About two-thirds of the world's supply is obtained from the United States. At the present time the United States can be divided, in a general way, into three principal fields. These are (1) the Pennsylvania, or eastern, field, including all the oil-producing regions east of the Mississippi River; (2) the field variously spoken of as the mid-continent, or the mid-western, or the southwestern field, including the states between the Mississippi River and the Rocky Mountains, and (3) the Pacific Coast field, including California and the Rocky Mountains. The approximate production annually of each field is:

Field.	Annual production of crude in barrels.
Eastern	31,000,000
Mid-Continent	55,000,000
Pacific Coast	90,000,000
Total	176,000,000

Practically all the crude oil obtained in the eastern field has what is called a paraffin base. By this is meant that if all the different liquid oils were taken out of the crude oil we would have crude paraffin left in a solid form. The southwestern crude oil has an alsphaltic or semi-asphaltic base. The Pacific Coast crude oil has an asphaltic base.

These four grades of fuel are obtained from the different crude petroleums by a process known as fractional distillation. The crude petroleum is put into a big vat or "still" and is heated up to a certain temperature. This temperature depends upon the exact nature of the crude oil that is being distilled. It is kept at this temperature as long as any important amount of vapor is being driven off. This vapor is conducted to what is called a "condenser." Here it is condensed into a liquid. This liquid is used as a source of certain oils used for certain purposes in the arts and sciences.

Then the still is heated up to another and higher temperature. Again, and in all cases, the exact temperature depends upon the crude oil that is being refined. It is kept this hot as long as very much vapor is being given off. The vapors are condensed and called gasoline. The temperature of the still may be raised gradually, a few degrees at a time, the vapors given off at each step in the change of temperature being condensed and collected in different tanks. This gives the different grades of gasoline.

Then by making another general raise in the temperature of the still and collecting the vapors they get the naphtha. The next general raise gets kerosene. This is why the process is called fractional distillation; because they distill only a fraction at a time.

COSHOCTON GIVES AID TO S. & M. TIRE

The S. & M. Tire & Rubber Co., recently organized under the laws of Ohio with an authorized capital of $400,000, has secured a site in Coshocton, in that state. The site comprises two acres of land and a disused factory building, which were contributed by the Coshocton board of trade, while the citizens of the little town are expected to subscribe to $100,000 worth of the company's stock.

ALMA AUTO CO. TO PUT OUT MOTOR TRUCKS

The Alma (Mich.) Motor Truck Co. has been formed and has taken over the interests of the Alma Mfg. Co. and will put a 1,500 pound truck on the market, under the name of the Republic motor truck. The company has interested three of the largest sales companies in the country in the venture and will have trucks on the market by July 1. A sales office will be opened by the company in Detroit and the model auto trucks displayed.

THREE-PLY GABOON MAHOGANY

This article is made throughout of Gaboon mahogany, the inside being exactly the same as the outside veneers. The panels are made by cementing the different layers together under great pressure. The grain of the middle layer runs at right angles with the grain in the outside layers, thus giving the finished panel great strength. The result is that a panel of about 3/16 in. thick is equal in strength to a straight-cut board of about 1 in. thick. The cement used is waterproof, and panels have been submitted to a very severe test of steaming and soaking in boiling water for a considerable time, but neither operation has caused the layers to come apart. The goods will bend under steam, and in our opinion the article should prove to be ideal for body panels and dashboards. Mahogany boards, it is well known, split when they receive a blow, while metal easily dents, but this article, even in its thinnest size, is very difficult to split. It is exceptionally light, and will take paint well.

The panels are made in all thicknesses from 3 mm. to 40 mm. (there are 25 mm. to the inch). Stock sizes range from 32 by 22 in. up to 47 by 47 in., but for reasonable quantities panels and dashboards can be cut exactly to the size required, so long as they do not exceed 47 by 47 in.

The goods are made in Holland, and shipped in crates under the brands of "Picus" and "Ibus."

STEEL BELTS FOR POWER TRANSMISSION

Consul Franklin D. Hale, Huddersfield, England, reports that the use of steel belts in some of the large manufacturing establishments of Huddersfield has been most satisfactory. At a local mill a steel belt 7⅞ in. wide, weighing 119 pounds, performs the work formerly done by a leather belt 22 inches wide, weighing 814 pounds, driving 300 horsepower. In another mill a steel belt 3½ in. wide, weighing 12 pounds, does work in driving 40 horsepower that formerly required a leather belt 12 inches wide, weighing 64 pounds.

These are concrete instances of the success of this German invention. The steel belt is also an economizer of space, does not slip or stretch, and gives the greatest efficiency of power delivery. A government test has shown a saving of 61 horsepower on a drive of 640 horsepower in using the steel belt.

Serviceable wooden pulleys need not be discarded in changing to the metal belts, for the former can be easily, and at small cost, converted into serviceable ones for steel belts by stretching a steel band over the top of the grooves, thus obtaining a flat pulley.

VEHICLES IN THE EAST

The consul at Aden says carriages and carriage sundries are imported almost exclusively from the United States, the trade amounting to $5,000 or more a year. Some of the leading American carriage manufacturers have their agents at Aden. Only recently the family of the Sultan of the Abdali placed an order for an American victoria. A few English carriages may also be found here, but the public vehicles, numbering about 200, are all of American origin.

TIMKEN ENLARGES NEW YORK BRANCH

Increase of eastern business has made it necessary for the Timken Roller Bearing Co. and the Timken-Detroit Axle Co. to double the size of their New York branch, at Broadway and 68th street. They have leased the store next their former place, throwing the entire floor into one large room.

Frank B. Sim has been appointed assistant advertising manager of the Timken-Detroit Axle Co. and the Timken Roller Bearing Co. Previously he was connected with the Burroughs Adding Machine Co.

THE COLUMBUS 200-MILE RACE

The third annual 200-mile race, which is the classic dirt track event of the year in motor circles, will be held at Columbus, O., July 4. The track of the Columbus Driving Association, which is the one used for the event, is by far the best dirt track in the country, and upon it all of the records from 75 miles to 200 miles have been made. It is also the first track of the country to stage a 24-hour race, and the record for such a race was held by it for some time.

Twelve cars will be started, many of which participated in the 500-mile race at Indianapolis.

The committee in charge is L. M. Browne, chairman; J. C. McIntyre, Frank J. Girard, F. H. Thorpe and J. W. Means.

SPRING BARREL CURTAINS

To put curtains upon the spring barrel is a very simple matter, yet a great many trimmers are often perplexed by the curtain wrinkling when rolled up. This fault lies mostly in the manner of attaching the curtain to the roller, which in a number of cases is the source of all the trouble, that is, the silk has been pasted to the roller, which is wrong. In preparing spring curtains, paste a piece of stuff around the barrel (black linen is as good as anything), to which the silk should be sewn, and be very careful to sew it on square, so that it will wind up true when in place.

Wind up the spring by turning the barrel, then sew on the curtain, and in the spring running down it will wind up the curtain; and in pulling down the curtain it will wind up the spring again.

CREDITORS WILL MANAGE, ABBOTT MOTOR COMPANY

The financial difficulties in which the Abbott Motor Co., makers of the Abbott-Detroit car, Detroit, have been laboring for several months have been cleared away by a reorganization, in which the creditors take over the management of the concern, giving a long extension of time on the present indebtedness and provide funds for the continuance of the business. Albert E. Schaffer, of Cleveland, will be president and general manager.

ENTERTAINED THE SELLING END

About twenty-one representatives of the Oliver Chilled Plow Works, of South Bend, Ind., spent May 27 in Winona, Minn., the guests of the Winona Wagon Co. The day was spent in showing the plant, the steps necessary to manufacture the Winona wagon, the tests under various conditions, and in general getting the visiting representatives well acquainted with the company's product.

DeKALB COMPANY WILL MAKE TRUCKS

The DeKalb Wagon Co., formerly the Sycamore Wagon Works, DeKalb, Ill., has purchased the greater part of the assets of the bankrupt Randolph Motor Truck Co., Flint, Mich., and have had the materials, etc., shipped to their plant at DeKalb. Some additions are being made to the DeKalb plant, and the company expects to soon start the manufacture of trucks.

"WEIGHTY EVIDENCE" IN AXLE LAWSUIT

Several trucks and a small army of workmen were required to carry the evidence into the Federal court in Waterloo, Ia., where the Mason Motor Car Co., of that city, is being sued for $100,000 by the American Ball-Bearing Co., of Cleveland, O. The evidence consists of numerous axles and parts and is weighty, to say the least. The axle company is suing for the price of 1,000 axles.

PRICE CUTTING

Mr. Herbert Austin, new president of the Institute of British Carriage Manufacturers, in his inaugural address, said in part:

"Although I have been making carriages for a long period and have made large quantities of them, I have always felt that I have not studied the business in the way that an ordinary carriage builder has studied it in the past. I am extremely pleased to be able to be your president, because I can say that at none of the meetings at which I have assisted in other institutes or societies have I derived the same pleasure, or met with such cordiality and kindness, nor have I seen the business conducted in the same friendly spirit as at these meetings. There is no doubt that the carriage building industry in this country is passing through a very difficult time, and it cannot look to any other body except this institute to help it out of some of those difficulties. Many of those difficulties depend for their solution upon personal attention and personal ability, but there are others that can only be dealt with collectively, and I feel sure, in the coming session that if some of those difficulties are taken in hand and pressed to a finish the carriage building industry in this country will derive very considerable benefit. One of these difficulties, namely, that of price cutting, is a very important matter, but it cannot be dealt with individually. No one can set up a particular standard, if the rest are cutting prices and carrying on their business in an improper manner. There are other questions which will come up for discussion, one of these being the relations between the carriage builder and the motor chassis builder. I propose to allude to that matter, particularly as I take it that my election to the presidency of this institute is proof that the old antagonism which used to exist is passing away, even if it has not already entirely died out. I have accepted this position with a full determination to do my best in every way that I possibly can for the good of the institute."

E. Manville, president of the Society of Motor Manufacturers and Traders, present as a guest, made remarks that the members of the C. B. N. A. could take to heart, and ponder with benefit. He said in part:

"I must confess that I feel rather diffident in rising to propose what I think I may justly call the toast of the evening. This is not the first, or the second, or even the third time on which I have had the honor and pleasure of being present at your annual banquet and proposing this toast in my official capacity as president of the Society of Motor Manufacturers and Traders. It gives me especial pleasure to endeavor to propose this toast once again because this is, I think, the first occasion in the history of your institute when one, whom we of the automobile industry may justly claim as one of us, has been selected to fill the honorable position of president of your institute. Nothing could show more clearly the strength of the aliance—the merging of interests—which is taking place between the coachbuilding industry and the automobile industry than that fact.

"Never before in so short a space of time has there been such a complete transposition of traffic conditions as has happened in the transference of road haulage from vehicles drawn by horses to those propelled by engines. It is not difficult to conceive why it was hard for you gentlemen, composing the coachbuilding industry, to realize, or believe, that at all events after a lapse of only a few years it would be possible for the horse to be almost entirely supplanted as it is. I do not suppose there has ever been quite so quick a revolutionary movement as that which marks the advent of the automobile. There were many firms engaged in the carriage building industry who accepted that fact at the very beginning; others were loth to accept it, but it may be said today that the carriage builders of ten years ago have almost exclusively devoted themselves to the carrosserie of the motor car of the present day. The Motor Manufacturers' Society recognizes, and has for a number of years past recognized, that it must, and should, work hand in hand with the coachbuilding industry. There have been certain complaints for which the society is not responsible by its will, but only by force of events. There have been complaints by your institute as to the limited space accorded to the coachbuilders in our exhibition. That was not due to any want of will on the part of the society, but only to the want of sufficient space. Nevertheless, I do not think that the coachbuilder of today may congratulate himself on the fact that practically the whole of the exhibition—those parts allocated to manufacturers of chassis as well as those parts devoted to the coachbuilders themselves—was practically a coachbuilders' exhibition. They could not have more adequate representation than they do. Only a few years ago it was the custom to exhibit the polished chassis—polished nickel, gilded and got up in a style which never attained in practice, and coach work was given only a secondary position. Today, as we know, the polished chassis is almost a thing of the past. The stand of every manufacturer is crowded with the best coach work he can purchase from you, gentlemen, who build bodies."

COMMERCIAL MOTOR VEHICLE EXHIBITION IN LONDON

Consul General John L. Griffiths says the interest in commercial motor vehicles in the United Kingdom has arrived at a point where it is considered of sufficient importance to hold an exhibition devoted to the trade. One will be held at the Olympia, London, July 15 to 30, 1913, and will be known as "The Heavy Motor Vehicle Show."

NEW CARRIAGE PLANT FOR LIMA, O.

Work has been begun on the carriage factory of the Owen Bros. to be erected on Central avenue just south of the Market street corner, Lima, O., where they have a lot with a frontage of 120 feet on Central avenue and a depth of 70 feet. The new structure will be three stories with basement and will cost $15,000. The building is to be completed by September 1.

SCHACHTS REPORTED LOOKING FOR PLANT

According to the Columbus (O.) Journal, G. A. Schacht and William C. Schacht, formerly manufacturers of the Schacht motor car, Cincinnati, will reenter the automobile manufacturing business and are looking for a factory they can buy.

CHALMERS PARTS WITH HIS APPENDIX

Hugh Chalmers, president of the Chalmers Motor Co., of Detroit, was operated on for appendicitis in the Harper Hospital in that city. He was reported making favorable progress toward recovery.

GORDON RUBBER PLANT TO BE ENLARGED

The Gordon Rubber Co., of Canton, O., whose main plant is located in Beach City in the same state, has let contracts for the erection of two new factory buildings. They will be one-story brick structures, 40 x 200 feet and 40 x 50 feet, respectively.

CROWN TO BE A FRICTION-DRIVEN CAR

The Crown Motor Car Co., of Louisville, Ky., which was organized some three months since by B. F., C. H. and A. B. Lambert, has acquired manufacturing facilities at 121 North Third street, in that city. It will be a four-cylinder, 30 horsepower, friction-drive, wire wheel model and will be sold at a popular price.

TO DOUBLE CAPACITY

The John Flanagan Buggy Co., of Greenville, N. C., is about to erect an addition to its plant about equal to the size of the present factory.

Trade News From Near and Far

BUSINESS CHANGES

Emil Erickson has succeeded to the business of Erickson & Miller, in Souris, N. D.

A. C. Kirkpatrick has sold out his stock of vehicles, etc., in Lisbon, Ia., to J. A. Reed.

Wm. H. Robson has sold his stock of buggies, etc., in Ovid, Mich., to Wm. Montague.

R. E. Fender has purchased the stock of buggies, etc., of D. A. Hawk, in Tingley, Ia.

Howard T. Hampton has purchased the business of George C. Calvert, in Chickasha, Okla.

Schlecht & Vogt have succeeded to the business of Louis Schlecht, Jr., in Okarche, Okla.

Ben Brunke has purchased the stock of vehicles, etc., of William Gorsuch, in Vesta, Neb.

Andrew Armour has suceeded to the entire business of Barrett & Armour, in Hecla, S. D.

Yenne & Pankonia have succeeded Yenna & Keller in the automobile business in Grant, Neb.

H. Vaunda has purchased a stock of implements, etc., in Hebron, Neb., and will handle buggies.

Guy Niles has purchased the stock of vehicles and hardware of John R. Hudson, in Middleton, Mich.

Spaulding & Powell have succeeded to the vehicle business of Spaulding & Merriett, in Ionia, Mich.

Youngstrom & Hallner Bros. have succeeded to the business of Youngstrom & Biggerstaff, in Ithaca, Neb.

Wm. A. McElroy has purchased the stock of vehicles, etc., of G. S. Van Eman & Sons, in Jennings, Okla.

Henry Gosshans has disposed of his vehicle and implement business in Sutton, Neb., to M. Allison, of Edgar.

H. E. Roberts has disposed of his vehicle and implement business in Langford, S. D., to Gilbert & Holcomb.

Lookavill Bros. have purchased the buggy and implement business of McFarland & Hatfield, in Hastings, Ia.

Meyer & Uhlhorn have succeeded Gibson & Meyer in the hardware and vehicle business in St. James, Minn.

F. E. Keith has disposed of his interest in the vehicle business of Keith & Ross, in La Cygne, Kas., to C. J. Milton.

W. A. Hawkins & Son, dealers in implements and vehicles at Shelbina, Mo., have been succeeded by Geo. H. Schroth.

NEW FIRMS AND INCORPORATIONS

J. P. Clark is opening a new stock of buggies, etc., in Peru, Neb.

E. A. Benson has opened a stock of vehicles, etc., in Bradley, S. D.

The Plainview Buggy Co. has opened for business in Plainview, Tex.

Frank L. Cox is putting in a stock of buggies, etc., in South Dayton, Ia.

George Meller is about to open a stock of buggies, etc., in Angora, Neb.

George Pullman has opened a stock of vehicles, etc., in Wellsville, Kas.

Walter Jess is engaging in the vehicle and implement line in Bryant, S. D.

Nugent & Hubbard have engaged in the automobile business in Kimball, Neb.

Ralph Brown is opening a new stock of carriages and implements at Corning, Ia.

Sam Williams has opened a stock of vehicles, hardware, etc., in Newburg, Mo.

Bert Hawn is about to engage in the vehicle and implement business in Russell, N. D.

J. E. McKee has opened a new stock of vehicles and implements in Anadarko, Okla.

J. E. Parker is about to engage in the vehicle and implement business in Mitchell, Neb.

Daily & Evans have engaged in the vehicle and implement business in Caledonia, Minn.

Stevens & Parsons are about to engage in the automobile business in Woonsocket, S. D.

Stockman & Tangen have engaged in the vehicle and implement business in Wildrose, N. D.

McLean & Harrison have engaged in the vehicle and implement business in Checotah, Okla.

McLean & Harrison have engaged in the vehicle and implement business in Checotah, Okla.

The hardware firm of Frank M. Strouse & Son, Stanton, Mich., has added a line of vehicles.

Charles Mason has engaged in the automobile, carriage and implement business in Salem, Neb.

A. T. Pierson has just established himself in the vehicle and implement business in Peever, S. D.

W. E. Hamlet has added a stock of buggies, etc., to his hardware business in Columbus, Kas.

Quamme & Thinglested have engaged in the carriage and implement business in Northwood, N. D.

H. W. Knox has just engaged in the vehicle, implement and hardware business in New Bloomfield, Mo.

J. W. McGowan & Sons have opened a new stock of carriages and implements in Yates Center, Kas.

Townsend Buggy Co., of Reidsville and Winston-Salem, N. C., has been incorporated with capital stock of $50,000 to manufacture buggies, etc.

The Hazen Dump Wagon Co. has been incorporated in Manhattan, New York City, to manufacture and deal in wagons, etc., capital $100,000, by Henry L. Hazen, Fort Lee, N. J.; Frederick W. Dau, Lancaster, N. Y.; Arthur J. Carleton, Edgewater-on-Hudson, N. J.

FIRES

The Keith-Kerr Carriage Works, Sharon, Pa., were destroyed by fire on May 12.

The Coble & Moretz wagon factory at Philadelphia, Pa., was destroyed by fire June 10.

Fire caused by lightning destroyed the Novak & Bobbitt wagon factory and the Fox general store at Downey, Ia.

FIRE DAMAGES MAIS TRUCK FACTORY

Damage to the extent of $90,000 was done in the plant of the Mais Motor Truck Co., of Indianapolis, by fire. While other portions of the company's property were damaged, the principal loss was in the building which is utilized as a stock room.

PEUGEOT ESTABLISHES AMERICAN BRANCH

The Peugeot people lost no time in turning Goux's victory to advantage. They have formed the Peugeot Auto Import Co. and leased quarters on Broadway, New York.

OBITUARY

Balthazer Koehler, who had lived in Chicago 63 years and was one of the pioneer carriage and wagon manufacturers, died there May 3, at the home of his daughter, Mrs. Eva Link, 1808 West Jackson boulevard. Mr. Koehler was born in Germany 85 years ago and moved to Chicago in 1850, at which time he established a wagon factory at West Van Buren and South Canal streets. He retired from active business 20 years ago.

James F. Quimby, a former carriage manufacturer of Amesbury, Mass., died May 27, at his home on Whittier avenue, at the age of 79 years. He is survived by a widow, two sons and two daughters.

Joseph W. Barclay, 83 years old, a retired carriage manufacturer of Bowling Green, Ky., died May 31 from a stroke of apoplexy. He was at home alone and was in the bath tub when stricken. He was born in Warren county, Ky., and only retired from active business one year ago. He is survived by a wife, one daughter and one son.

SALE OF COLUMBUS BUGGY CO. CONFIRMED

The sale of the property of the Columbus Buggy Co. to a committee of creditors representing claims aggregating $500,000, for $310,000, will stand. The debts of the company aggregated $625,000. A majority of the creditors, fearing that the property would go low, formed an organization to bid it in and did so. The McCue Company insisted that the property would sell piece-meal for more money and since the sale $100,000 has been offered for the "slow assets," but Judge Sater figured out that the creditors would receive in any event not more than $40,000 more by setting aside the sale for this—subject to a further reduction of expenses and no one came forward when he suggested that bond against loss by a new sale be given.

Creditors of the concern who did not enter into an agreement with the committee who purchased the property when sold by the United States court will get about 35 per cent. of the amount of their claims, while the creditors who entered into the agreement expect to get twice that sum.

IMPROVEMENTS AT HARLEY-DAVIDSON PLANT

The Harley-Davidson Motor Co., of Milwaukee, Wis., is building a factory addition to contain 36,960 square feet of floor space. The structure is to have a frontage of 85 feet on Chestnut street and a depth of 60 feet. Steel and concrete are to be used. This will be factory No. 8.

Because of the great size of floor area it is necessary, under the building ordinance, to construct fire walls on each floor. North of the factory and adjacent to the shipping yard and side track, a 6,000 pound elevator will be built. Track depression proceedings pending before the railroad commission made it necessary to construct the last three factory additions so that freight can be handled at the present level of the tracks of the northern division of the Milwaukee road or at the proposed new grade which will be about twelve feet lower at Chestnut street.

WILL CONSOLIDATE PLANTS

The plant of the Jonesboro wagon works has been purchased by Dan O'Connor, of Camden, Ark., and will be moved there and installed in the building now occupied by Mr. O'Connor as a wagon factory and repair shop. Mr. O'Connor has been in the business of making wagons on a small scale for a number of years. He expects to enlarge his output with the machinery of the Jonesboro wagon works.

COLUMBUS BUGGY CO. OF KANSAS CITY FAILS

The Columbus Buggy Co., of Kansas City, Mo., went into involuntary bankruptcy May 5. A petition was filed in the federal court against the company by the People's State Bank, of Detroit, which, the petition says, holds notes for approximately $5,000, four months overdue.

In answer to the petition the company admitted its inability to pay its debts, and its willingsness to be designated a bankrupt.

Judge Van Valkenburgh ordered the case taken before W. B. C. Brown, referee in bankruptcy, and at a meeting of the attorneys with Judge Brown, Joseph M. Jones was appointed receiver and ordered to take charge of the affairs of the company.

The Columbus Buggy Co. was organized as a branch of the Columbus Vehicle Co. of Columbus, fifteen years ago by John F. Taft. The company later became an independent concern incorporated for $125,000.

A GOOD AND GREAT TIME

British and American automobile engineers spent May 28 in Pittsburgh inspecting the steel plants of the district. The party was entertained by members of the local automobile organizations and the Pittsburgh Industrial Development Commission. While the men were in the mills, the ladies of the party were entertained in several Pittsburgh homes. In the evening a reception was held in the Fort Pitt Hotel.

The special cars of the party were taken off the train at Shadyside station and parked there. Automobiles took the members to the Pittsburgh Athletic Association clubhouse for breakfast. Here the local reception party met the visitors.

In the night the special cars were taken up by a western train and a trip to Indianapolis begun. There the party, with many Pittsburghers which accompanied it, witnessed the 500 mile automobile race. From there all left for Detroit.

PURCHASE BUILDING SITE

Owing to the fact that the present building of the carriage establishment of W. T. Lawton & Sons, at 2708 M street, Washington, D. C., is within the lines of the proposed parkway between Rock Creek and Potomac parks, the company has purchased a new site for a building at the northeast corner of Twenty-second and M streets. This property has large frontages on both streets, 130 feet on M street and 100 feet on Twenty-second street, and contains 13,314 square feet.

Although it will be unnecessary for the company to vacate its present location for some time, plans are being made to erect a four-story building on the new site. The company has occupied its present building for 26 years. The cost of the new building will be about $60,000.

Wants

Help and situation wanted advertisements, 1 cent a word; all other advertisements in this department, 5 cents a word; initials and figures count as words. Minimum price, 30 cents for each advertisement.

PATENTS

Patents—H. W. T. Jenner, patent attorney and mechanical expert, 606 F St., Washington, D. C. Established 1883. I make a free examination and report if a patent can be had and exactly what it will cost. Send for circular.

SITUATIONS WANTED

Situation Wanted—Carriage painted striper and finisher; can take charge; prefers job in small town in custom shop. Painter, Box 144, Jamestown, Ohio.

THE FEDERATION OF TRADE PRESS ASSOCIATIONS IN THE UNITED STATES

Business Promotion Through Trade Press Efficiency

is to be the keynote of the most notable gathering of technical, class and trade journal editors and publishers ever held in America. No live manufacturer, sales manager, advertising man, trade paper editor or publisher can afford to overlook the

Eighth Annual Convention of the Federation of Trade Press Associations in the U. S. at the Hotel Astor, N. Y., Sept. 18, 19, 20, '13

Two sessions will be held daily. There will be editorial, circulation, advertising and publishing symposiums under competent leaders. Many of the leading editors, business managers, buyers and sellers of advertising, and authorities on modern merchandising methods will take part. On Friday afternoon, September 19, there will be a mass meeting with addresses by representative business and professional men, on subjects of timely interest to editors, publishers and advertisers. Distinguished guests and worth-while speakers will be at the annual banquet, which will be made a memorable social occasion. No matter what may be your connection with the trade journal field, if you are interested in the idea of business promotion through trade press efficiency, if you believe in business papers for business men, you will be welcome at all sessions.

Full information may be obtained from

The Committee of Arrangements

WM. H. UKERS, Chairman, 79 Wall Street, New York

The Federation of Trade Press Associations in the United States

President	Secy.-Treas.	Vice-President
H. M. Swetland	Edwin C. Johnston	E. C. Hole
New York	New York	Chicago

INDEX TO ADVERTISERS

The Hub

Entered in the New York Post Office as Second-class Matter

Vol. LV JULY, 1913 No. 4

THE TRADE NEWS PUBLISHING CO. OF N. Y.
Publishers of THE HUB

J. H. WRIGHT, *President.* G. A. TANNER, *Secretary and Treasurer.*
24-26 MURRAY STREET, NEW YORK.

Other Publications of Trade News Publishing Co.:
HARNESS (monthly).....per year, $1.00
AMERICAN HARNESS AND SADDLERY DIRECTORY (annual).....per copy, $4.00

THE HUB is published monthly in the interest of employers and workmen connected with the manufacture of Carriages, Wagons, Sleighs, Automobiles and the Accessory trades, and also in the interest of Dealers.

Subscription price for the United States, Mexico, Cuba, Porto Rico, Guam, the Philippines, and the Hawaiian Islands, $2.00, Canada, $2.50, *payable strictly in advance.* Single copies, 25 cents. Remittances at risk of subscriber, unless by registered letter, or by draft, check, express or post-office order, payable to the order of TRADE NEWS PUBLISHING CO.

For advertising rates, apply to the Publishers. Advertisements must be acceptable in every respect. Copy for new advertisements must be received by the 25th of the preceding month, and requests to alter or discontinue advertisements must be received before the 12th day of the preceding month to insure attention in the following number. All communications must be accompanied by the full name and address of writer.

FOREIGN REPRESENTATIVES:

FRANCE.—L. Dupont, publisher of *Le Guide due Carrossier,* 78 Rue Boissiere, Paris. Subscription price, 15 francs, postpaid.
GERMANY.—Gustave Miesen, Bohn a Rh. Subscription price, 12 marks, postpaid.
ENGLAND.—Thomas Mattison, "Floriana," Hillside Avenue, Bitterne Park, Southampton. Subscription price, 12 shillings, postpaid.

Entered in the New York Post Office as Second-class Matter.

The Carriage League

A meeting of southern buggy builders, also some from the central states, that took place at Charlotte in North Carolina, seems to have been an important movement, and one that will be big with results if the formulated plans are carried to success.

The southern builders are facing onerous conditions. Their raw material has climbed nearly to the top of Mt. McKinley in price; it has to be paid for on short time, and the outgo of the business generally is on a prompt cash basis while the income is on painful and sometimes distressing long time.

The prices of the finished product are not in line with the cost. The business is not a money-making one. Such a group of facts surely call for action.

Besides these primary conditions, there have crept in with the years many annoying small expenses that aggregate large sums, such as the giving away of extras, or charging too little for them.

It is usual for those suffering from the stress of competition to think and say there are too many buggies being built to satisfy the demand. All manufacturers think along such lines, but in this especial trade the buggy makers have the logic as well as the facts of the situation in the contention. There are too many buggies being made. This causes an effort to get the profit out of quantity production, which only aggravates the case.

Usually when such a state of affairs continues for a sufficient time liquidation supervenes through failure. Sometimes this does not alter facts because the failure continues under the rule of the court by receivership, and that is worse, for a time at least.

The automobile has had its bad effect on the wholesale buggy business in one way that is serious. The purchaser of a car must somehow raise the cash to pay it down for his car. He may do so often at the expense of the dealer to whom he owes long overdue money for his horse vehicle. This sets up a chain of consequences that is a long one.

This leads the buggy builder to take just such action as we have commented upon. He wants to get nearer that ideal automobile cash basis.

The league that has been organized is going to take some or all these conditions in hand and try to work them out for the good of the trade.

It is a worthy aspiration. It receives its initiative from able men who are under the spur of necessity, and it deserves the most uncompromising success. We hope it will have it.

A Fairy Tale of Trade

The Ford car is ten years old. There has just been distributed a ten million dollar dividend. The output is now nearly if not quite two hundred thousand cars a year. The main plant has grown from an area of one-fourth of an acre to over 117 acres, and it is contemplated to double this. Of workers, the original band has grown from 311 to 16,000.

This is a sure enough fairy tale of trade. It is something to marvel at and talk about, and it is talked about all around the vehicular world. It is a stunt.

Mr. Ford is a man of one idea, one car, one model, one purpose, and in fact he is a shining example of the oneness of the one.

His shop is like a mammoth pants shop, cutting out thousands of pants of one kind, texture and pattern at one clip of the shears. It is the last word of efficiency, duplication and sameness. The satisfying of the popular demand at a popular price at a very satisfactory profit

for the service. It is the wholesale buggy proposition over again in a larger, jucier field without the buggy competition against itself. It is meeting the average demand just as shoes are handed out to an army. All the shoes nearly fit in an average way, and they answer the purpose.

It is wonderful because volume always impresses, but if it was the way of the trade throughout the trade it would be a leveling process that would effectually stop all original thought, all improvement, all progress, all superexcellence, all that is the outgrowth of thought, art, superiority.

Such work has a place, it is needed in its place because it serves a humanity that is itself an average, a mediocrity, a crowd.

What would produce the Brewsters, Healys, Packards, Mercedes, Kellners, technical schools, or in other words, the idealists, the men who improve, who marry art in design to excellence in construction, if we were all myriad producing Fords to the exclusion of all else!

The Cycle Car

The move in England to produce a small, very light car for one, two or three passengers to be sold at a low price is making much headway.

There is much incidental talk about heading off the so-called American invasion with these nice little cars, but so far as we can judge from the prices we have seen quoted, the American cars now established in the English market have still the best of the price and more carrying capacity.

Be that as it may the cycle car is a neat little runabout, and it is giving a good account of itself. It has some queer lines, here and there, but it capers about the country, up and down hills, and comes back home carrying its passengers with it.

The American builder is never short on his stock of imitation, so we have already a cycle car now making its bow on this market. If the idea srikes fire, we will probably have a great number of them in a brief time.

This type of car is a compromise between a motor cycle and a "real" car, having more comfort but not so much speed as the motor cycle.

The development is young yet, and somewhat crude, but at the rate of progress it is making it is likely to be very much of a little car in a year or two.

Here, it seems to us, is a field ready made for the general vehicle builder. He could tap a strata of small money men that has not been at all developed in this country, one we believe that would yield results fully as astounding as we have seen in the field of the big car.

The sagacity to see these opportunities first is what counts. But it counts bigger to grasp and make use of them.

There is but little machinery about the little cars. They use mostly air-cooled engines. That does away at once with the plumbing and weight that is so objectionable in the big car. The traction is by chain, or leather belt, or disc, so there again is much simplification and reduction of cost.

Their light weight makes them a good proposition for bad roads. It would look like an easy matter to adapt the facilities of a buggy factory to their manufacture or assembling.

This looks like a way out, and a good, easy one, to those vehicle builders who think there are too many making buggies and are willing to leave the field for their pockets' sake.

It would need but the aggressiveness of a few pioneers to start such a trade going, and there would presently be a large following from among the number who always wait for the pioneers to blaze the trail. There would be room enough for a great many because it would not be easy for merely a few to supply the demand of the large, very large per cent. of population who have no cars, and to whom even five hundred looks like a heap of money. Two hundred dollar cars would go like butter cakes in a Childs' restaurant, and while we do not pretend to judge of cost, we think such a figure would leave a nice profit, certainly more profit than there is at present on a wholesale buggy.

We hope to be able to chronicle some such development in the trade. We believe it would do what the trade has not yet done—grow millionaires.

Statistics of the Automobile Trade

On another page is given the findings of the Census Bureau, condensed from the forthcoming unabridged report by an official of the Bureau.

Last month we spread before readers the statistics of the horse-drawn vehicle trade.

These figures are as of 1909, and take no account of such subsequent progress as has been achieved, which must be considerable.

It will be more interesting to readers to do their own analyzing than to have it handed to them in ready-made editorial conclusion, so we merely present the statistics as officially compiled.

Viewed from any angle the figures of the business are remarkable. The quick growth appears to be a record, but now that the second stage of the business has been entered upon it is reasonable to expect slower progress and a solidifying process that will create years of somewhat uniform production.

Perhaps, however, such assumption may be rash, as any modification of type of engine, that could occur at any time, may be revolutionary in volumes as well as values, and again a new era of intense activity may supervene, with surprising results.

A Mistaken Impression

We have noted here and there that the wrong impression is being established about technical schools as a result of Mr. Heergeist's recent trip abroad, and his interesting rehash of about the same data that he gathered on a long-ago previous trip under the same auspices, that is, the patronage of the C. B. N. A.

There is nothing the foreign schools can show or do show that we do not show as well, or better, in our own

trade technical school for carriage draftsmen, but this seems to be foregotten by those who know it, and some are discussing the article and wishing we had something of the kind, who do not know it.

We think it is the proper mission of a real carriage trade journal to display such facts about our school as are patent to anyone of enquiring mind, and show that we are abreast of any such schools anywhere, and in some practical particulars we rather put it all over our good foreign friends.

The Hub will undertake to do this. It will serve two purposes. It will set the subject in a just light, and also square Mr. Heergeist with his report on his previous foreign excursion on the same errand.

What a Gallon of Gasoline Will Do

A recent test, using a popular car of rather light weight, on pretty good roads over Long Island, produced very nearly 87 miles on a gallon of fuel.

This, we believe, is a record. It is a remarkable exploit from any point of view. Of course, the handling of the car was expert. Advantage of reliefs from coastings so as to have power and fuel for hills, and all those refinements of good driving that are known to be possible but seldom availed of by the careless or inexpert were made good use of.

So much attention is of necessity given to the fuel question at present that trials of the kind spoken of are more than merely interesting. The engine that is an economical fuel user under even bad service is a fine talking point for the maker of the car.

It seems to us that the big factor is weight of car. We don't know if the engineer is giving a great amount of attention to this, but those "builders" who assemble could choose with care among a variety of parts in a search for those that were lightest if the other wanted features were present.

The parts maker is a very skillful man these days, and being a specialist, he produces something that is more often than not the best designed for its purpose to be found.

It looks as if the general vehicle builder could better enter the motor car field today than at any time, with the assured prospect before him of building something that would sell well.

The Battle of the Valves

A short time ago the Packard people submitted their engine to a gruelling test under the direction of the Automobile Club of America in New York City.

The test was of the engine, and accent was put on the poppet valve construction as standing up under all stresses and behaving admirably. The engine ran for three hundred hours. The engine was six cylinder and of 38 horsepower, very latest and best design.

The maximum, average and minimum power of the poppet valve was given as respectively 44.9, 35.7 and 28.7. At the end of the test the valve motor, it is said, was delivering less power than at the beginning.

The sleeve valve motor is the opponent of the poppet. It makes many claims of superiority, and it lays great stress on silence. It is up to the poppet to be as silent, etc.

Turning to the test of a Knight sleeve valve motor by an also standard authority, the Royal Automobile Club of England, we find the sleeve valve motor going for 320 hours. It was a four cylinder engine. Its maximum, average and minimum power was respectively, 59, 53 and 51, and the Knight showed increasing power as the test drew to a finish. The engine called for no adjustments during the test.

This is an interesting comparison just as a clash of types, as both competitors may fairly be considered as good as the best of their types.

Personally we have never thought the poppet valve was the best construction possible, and we have also thought that many makers would change if the cost of installation of new plant was not so forbidding, or if the stress of competition brought about action.

There are too many parts to the motor. It is too highly articulated, so to speak, to be economical in use over a long period, and we suppose sometime in the future all this will work out along lines of simplicity and greater efficiency.

It will be a most interesting development for the vehicle builder to observe, and it may point to his very great profit if he sees his opportunity.

SUCH LANGWICH!

W. C. Leland, of the Cadillac, made a speech when the English engineers were galivanting about the country as guests of American confreres. His topic was The Ideal Car and the Ideal Factory. Listen!

"The one black eye that the automobile industry has is the 'bum, rotten, damned bad cars' that are being turned out," adding that the way to better a product is to "know how" and to teach mechanics the use of machines in such a way that inspectors would not be necessary. "Inspectors are non-producers," he declared, "and no non-producer ever brought in dividends." He went on to say that more cars were needed now than ever, that 30,000,000 are wanted, that the Ford Motor Co. only could turn out 1,000,000 cars in three years, and created great laughter by turning to Henry Ford and remarking in an "aside," "You had better put on a double shift up there, Henry," quickly adding, "But for God's sake let us build good cars."

"When you get something good," he urged, "do not hide it, but show it to your competitors and tell them 'For God's sake, go and improve on it!'"

THE DOG AND THE AUTOMOBILE

This is not the dog the motor car converts into sausage, but the dog that has become the fashion, especially in France as an honorary footman on the vehicle.

It has become the fashion to use Collie dogs for this purpose. He is seen on the modest as well as the most pretentious vehicles in the town. With some it is the clear snobbery of fashion, with others it is the means of having a dependable protector to guard the belongings of the owners when none but the dog is on guard.

The fashion will probably cross the Atlantic given time.

THIS MONTH'S FASHIONS

(See Illustrations)

The Adams truck is made by The Adams Bros. Company, at Findlay, O. In our illustration we show a platform body with stakes. A distinguishing feature of the truck is the French type hood. Users find it a truck having much flexibility. Some speak very warmly concerning its merits.

No doubt truck body builders could make the necessary terms for chassis delivery and fit the body work according to wishes of customer. The illustration would help in such case.

The Universal truck here shown is a chain drive, but the Universal Motor Truck Co., of Detroit, the makers, are in the field with a worm drive built after the most approved practice after much study and investigation. The company make a point of supplying chassis and body so that a completed vehicle delivery is made.

The silence of the worm gear and its direct action is very convincing. The chain-driven model shown is very compact as to engine and space required for the working parts. The steering column and wheel and all hand appliances are designed to give room for the load.

The Kelly cut is one in the service of the Marine Corps (Navy), and is made by the Kelly-Springfield Motor Truck Co., Springfield, O.

This chassis is built in one and three-tone sizes, and is a very sturdy motor wagon that has the hard service trophy in view all the time. The chassis gives plenty of body room to suit varying needs. As a piece of good engineering practice, the truck has all the praise the makers could desire. It is a good proportion for body builders.

The very well proportioned panel and curtain body delivery wagon made by the Buick Motor Co., of Flint, Mich., shows a flexible, general purpose wagon that will pay its way and keep pretty constantly on the job.

The power plant of the Buick has been conspicuous for the way it overcomes road obstacles. Every ounce of the power is effective. This chassis also appeals to the wagon body builder for the leeway it gives him for body building of good cargo capacity.

The working drawing this month shows an eight-passenger omnibus of French origin, in side, half front, half rear, and horizontal views, drawn to a 1/10 scale in millimeters. It is credited to L'Auto Carrosserie. The body is treated in a way to make it look light, although it is a heavy job. Rather too much room given to the driver, but this is a detail of the chassis that the body maker must struggle with. For a hotel bus, for which the car is designed, it is one that has many features worth noting.

The public omnibus made for the Pittsburgh Transit Co. by The White Co., of Cleveland, O., is a fine example of a type of vehicle that is gradually taking a place in transportation that will grow as the merit of the vehicle develops with use. The comfort of entrance and exit, due to low step, the front face seating of the passengers, and the facility with which the fare can be collected all make for its high serviceability. A car of this character has to be well and stoutly made, and engined with economical power that must be very flexible, as the service presents load problems that are never stable. The White Co. has been very clever in its engineering department in meeting such conditions and has a gratifying record.

The bus illustrated is well proportioned, and even graceful in design, when the length and other problems have to be considered.

The Lange Model B chassis shown with a panel body is built in two models by the Lange Motor Truck Co., Pittsburgh, Pa. It will be noticed the chassis affords plenty load space.

The engine and the other power members have been carefully worked out to afford efficiency with economy. Many styles of bodies have been utilized on the chassis, from ordinary commercial styles to fire apparatus and passenger busses designed for a route service. Serviceability has been aimed at in all parts of the vehicle, and the record is satisfactory to all users.

The working drawing of two-wheel cart is an idea for a parcel post delivery cart that has to negotiate a rural route. Its springing tends to make it easy, and its balance seems to be such as to make the draft light. We think some such vehicle would be suitable for the purpose named, and offer the drawing as a suggestion.

TEN MOST IMPORTANT THINGS

"Don't drive tacks with a sledge hammer; there are enough people using tack hammers. You carry a sledge hammer and you attend to important things only," said President Hugh Chalmers to a gathering of dealers.

"One thing has helped me in my business. I make it a point to keep before me the ten most important things I have to do. I have a little pad on my desk upon which are noted the most important things; there might be seven, or ten or twelves, but the most important are daily before me. If I go to a business man and ask, 'What are the ten most important things you have to do in your business?' and he says, 'I don't know,' if he really doesn't know, how is he sure he is doing them? It is a good thing to keep them before you and as things come up write them down. Every morning my stenographer has on my desk the ten most important things I must attend to.

"Suppose a farmer had an 80-acre corn field and he should say to his helper, 'John, I want you to go down and drive the pigs out of the corn field,' and if you have never done that sort of thing you are not in a position to realize the task John had before him. He does not know how many pigs there are, so he goes all over the corn field to see whether they are all out. But if the farmer had said, 'John, there are ten pigs in the cornfield; go drive them out,' he would drive the ten pigs out and he would no longer chase pigs that did not exist."

Chalmers dealers have been furnished with the means of putting the idea into effect. Each month a pad containing blank sheets for each day of the month, bearing the date at the top and the heading, "Ten Most Important Things to do Today" has been sent to each Chalmers dealer.

The difference between men and the difference in the degrees of success that men attain lies largely in the careful planning and then in the faithful performance of those plans. Some men never get anywhere because they never take the time to sit down and plan. But the man who sits down a half hour before he goes home at night and maps out the "Ten Most Important Things" for the morrow has the odds in his favor because he knows what he is going to do that day; if he sticks to his list and cleans it up he will find at the end of the first week he has accomplished far more than he ever dreamed possible.

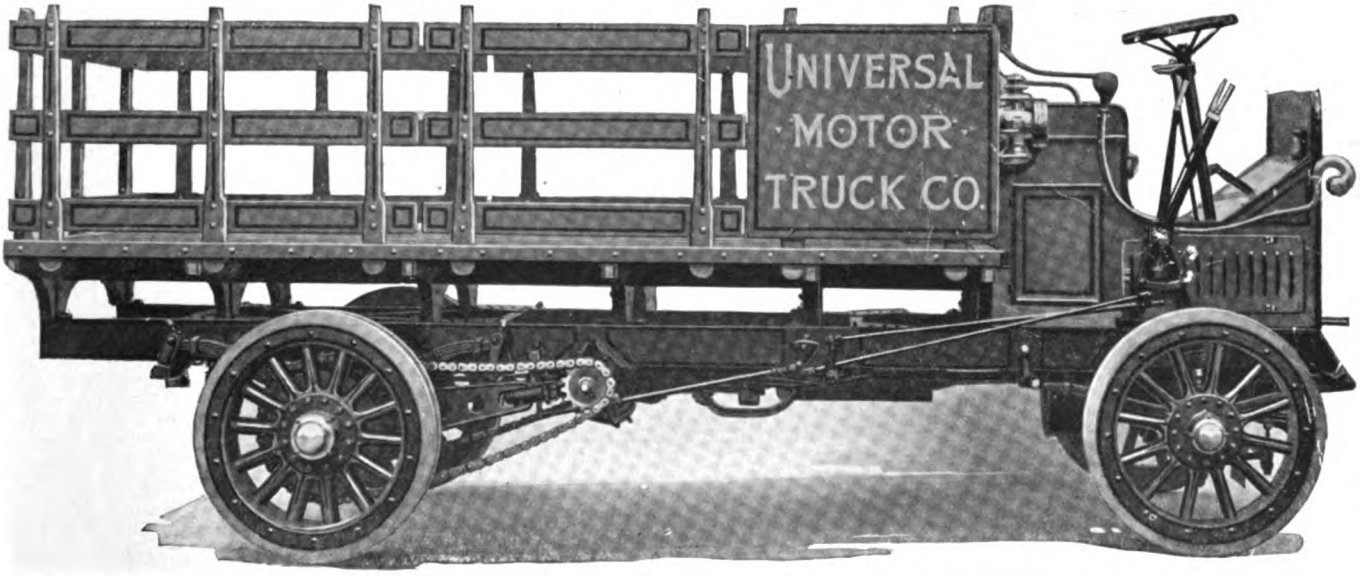
A. O. SMITH

Arthur O. Smith, president of the A. O. Smith Co., of Milwaukee, is no more.

The vehicle trade made his acquaintance at the time of the C. B. N. A. Milwaukee convention, where he exhibited his chassis. Since that time the company has grown enormously, having the largest factory in America under one roof. The business will continue under the management of his son, Mr. L. R. Smith, who will assume the duties of president. The stock of the corporation is held entirely by the family.

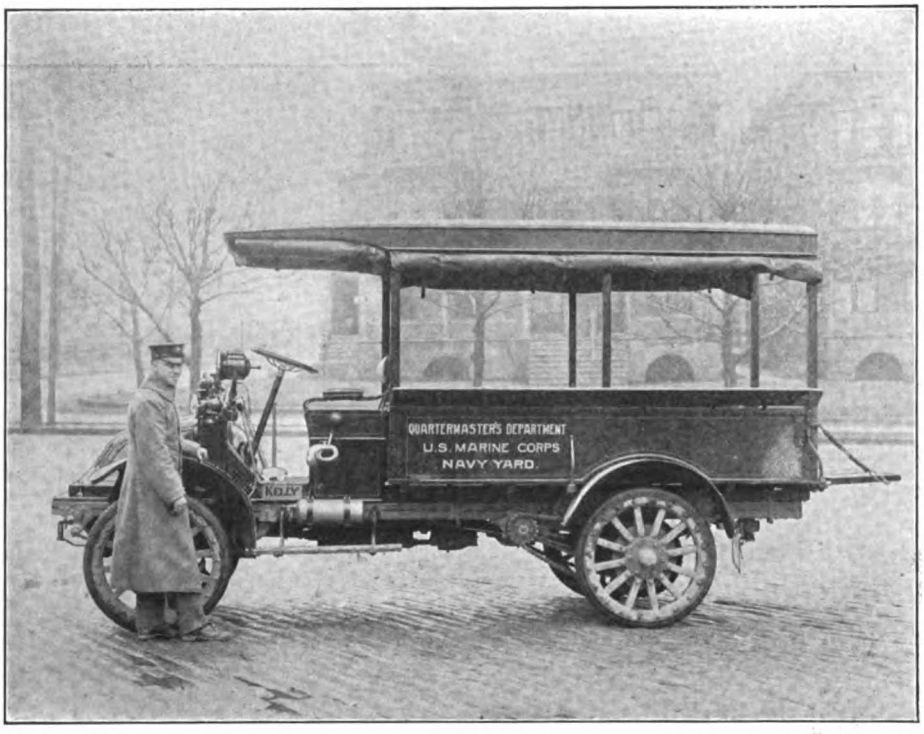
Vehicle Fashions For July 1913

AN ADAMS "DELIVER THE GOODS" TRUCK
Made by
THE ADAMS BROS. CO.
Findlay, O.

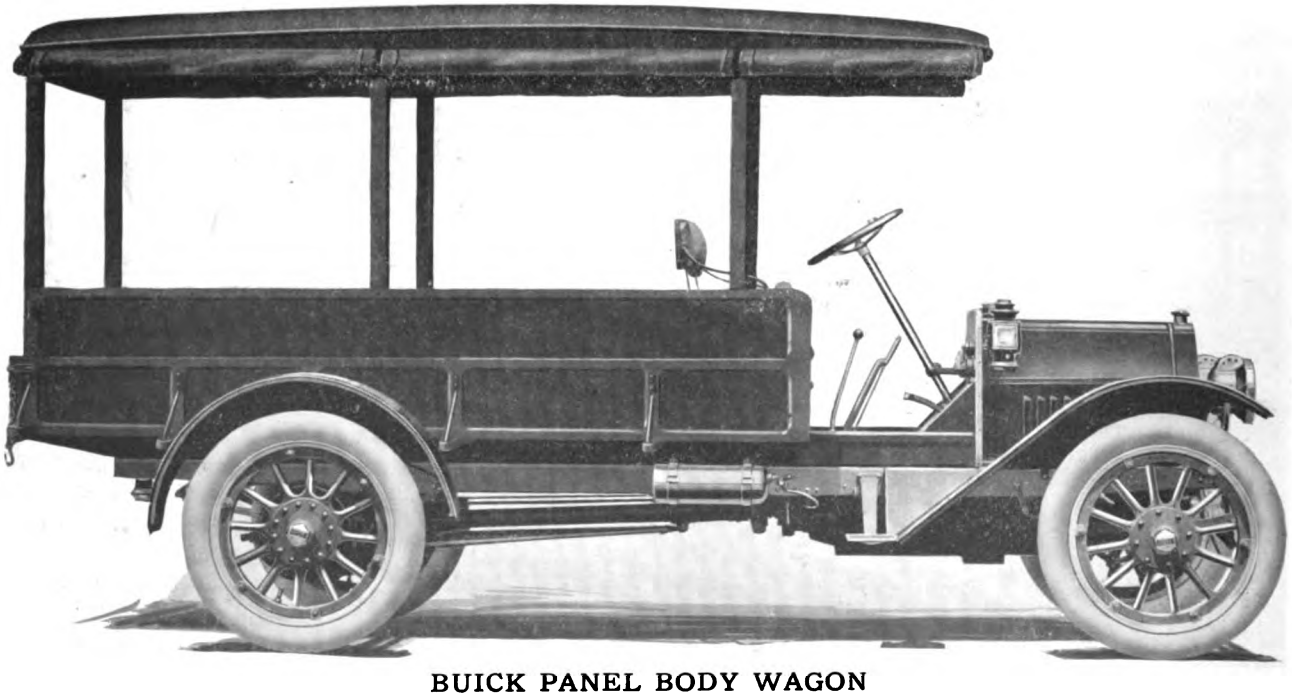


UNIVERSAL CHAIN DRIVE STAKE BODY TRUCK
Made by
UNIVERSAL MOTOR TRUCK CO.
Detroit, Mich.

Vehicle Fashions For July 1913

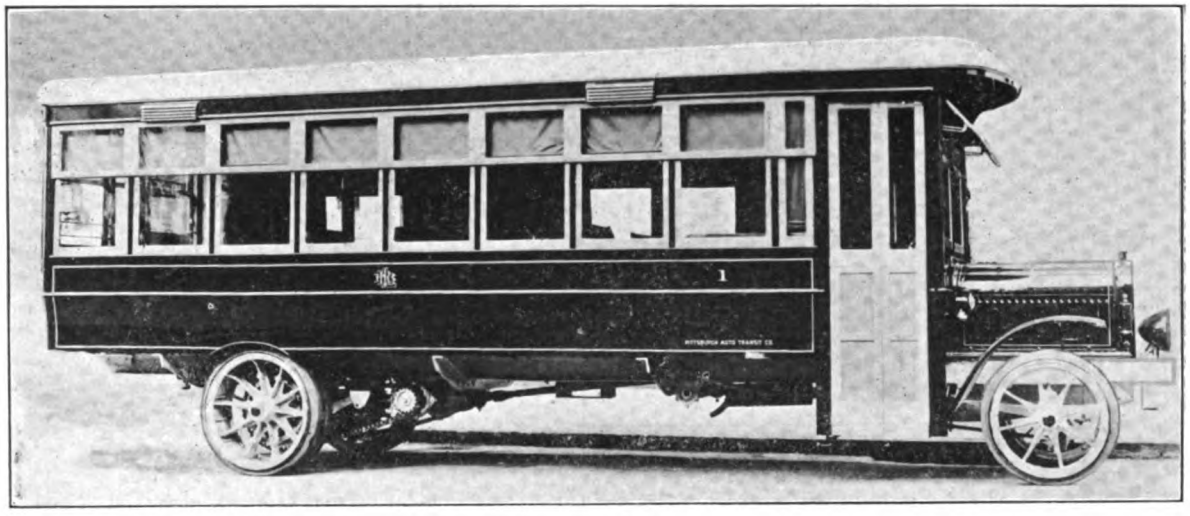


A NEW KELLY TRUCK
Made by
KELLY-SPRINGFIELD MOTOR TRUCK CO.
Springfield, O.



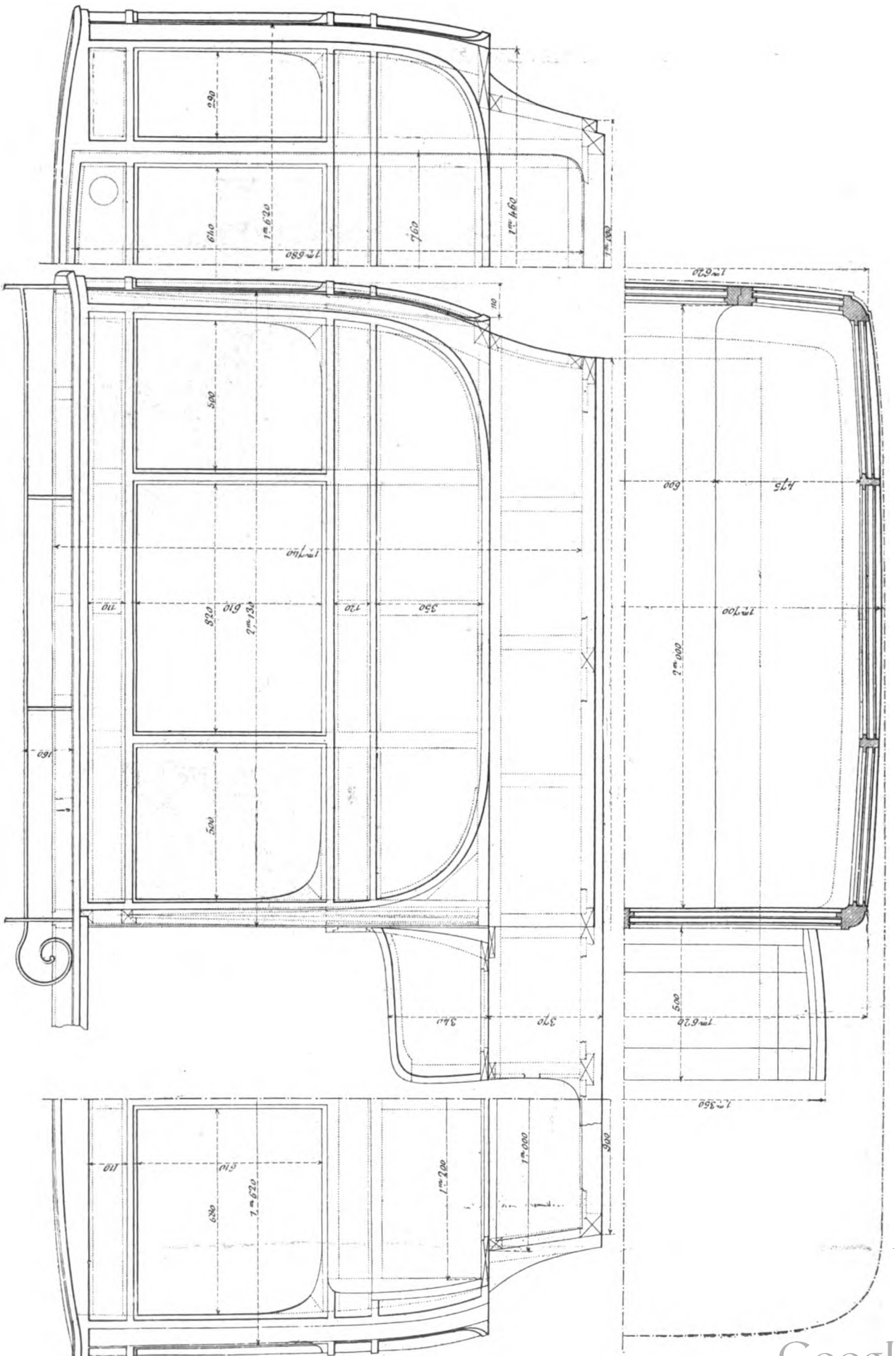
BUICK PANEL BODY WAGON
Made by
BUICK MOTOR CO.
Flint, Mich.

Vehicle Fashions For July 1913



PUBLIC TRAFFIC BUS OF PITTSBURGH AUTO TRANSIT CO.
Made by
THE WHITE CO.
Cleveland, O.

LANGE MODEL B TRUCK
Made by
LANGE MOTOR TRUCK CO.
Pittsburgh, Pa.



WORKING DRAWING EIGHT PASSENGER AUTO OMNIBUS

POSSIBILITIES OF COMPLETE ELECTRICAL CONTROL

No one can tell from the way a thing begins how it will end. No one can predict with certainty how given results may be brought about after the flitting past of a decade, regardless of the seeming permanency of such methods.

Especially is this true of the development of the automobile. While it is true that so far as control is concerned the automobile has been simplified to a degree that almost anyone can learn to handle it satisfactorily, the fact of its complexity remains. Electrical equipment was wholly missing from even the best of the earlier cars. Ignition had to fight its way at first, for the elusive nature of the currents was well exemplified in the first crude electric ignition installations, and criticism that was not only harsh, but in a measure justified by the then freakish antics of the revolutionary device, was the order of the day. Conviction that they were fundamentally right, coupled with the superior results obtained when electricity could be made to do its work, caused the advocates of electric ignition to persevere—and everyone knows the result.

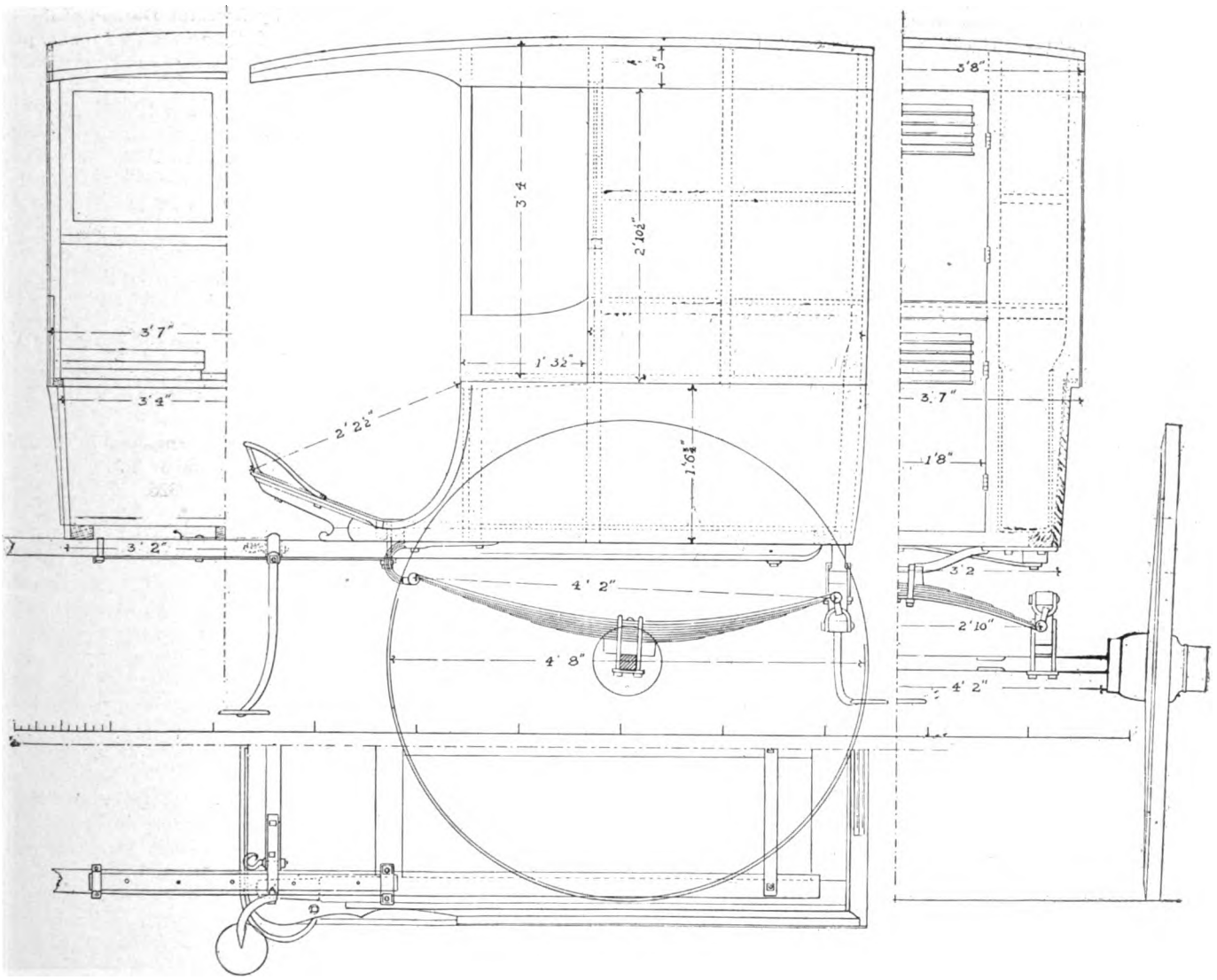
While the single fact that the electric ignition system stands alone, it is even more important in that it is the statring point of developments based upon the use of electricity as a tractable servant.

Illumination was an early and logical development, though it has taken some time to evolve the modern systems with complete automatic power plants—veritable little "central stations" with all requisites for practical operation.

The story of the electric starter is still in the telling, and the electric gear-shifting system still is so new that, though adopted as standard equipment on several well known cars, it is almost unknown, so far as the mass of car users is concerned. Electrically operated horns are commonplace, and electrically operated speedometers are in use on thousands of machines. Electricity supplies heat for hand and foot warmers, for raising the temperature of the carbureting system to facilitate starting, to assist in vaporizing the heavier fuels.

The magnets in electric gear-shifting systems have been applied, tentatively, to the work of braking and of operating the clutch, while smaller magnets have been arranged to work the motor valves, the cam shaft and its cams being replaced by a rotating contact-maker which distributes current to the valve magnets in proper sequence.

Electricity has been pressed into service as a means of transmitting the power of the gasoline motor to the rear wheels, and various forms of apparatus have been designed for this purpose, varying from a motor and dynamo set delivering current to the electric motors driving direct to the rear wheels, to a highly ingenious system in which the magnetic drag of the field, attached to the driving member, caused the armature, attached to the driven or rear wheel system, to rotate. In short, it is difficult to think of any application of electricity to the automobile that has not been attempted.



WORKING DRAWING PARCEL POST DELIVERY CART

The point, however, is not so much that things have been attempted as that they actually have been done more or less successfully.

But the very fact that electricity is so easily directed is the beginning of trouble. Electricity is very commonly and very accurately described as "elusive," and if the conditions are not what they should be the current goes wrong as readily as not. It has taken years to learn how to make insulation. A single defective contact in an electrical system may make the whole apparatus inoperative, and a single leak may rob it of its power. And these two things—the certain establishment of proper contact at the proper time, and the keeping of currents to the designed paths—have by their simplicity been stumbling blocks in the use of the comparatively mild currents employed in automobile work.

In many cars electricity has assumed the whole burden of starting the motor, to say nothing of the more commonplace ignition and lighting service; it is depended upon absolutely to sound warning signals, to operate speedometers, and now to shift gears—a task which is of such importance that the failure of the apparatus to function normally might lead to the most serious consequences. There seems no good reason why it should not be made to perform still further service. A certain amount of strength is required for the operation of the brakes and the clutch. Electricity has been applied to both these tasks with results that were no worse than the early results obtained in the use of electric starting and other systems, and the present knowledge of the art should be sufficient to cope with the problems involved in working brakes and clutch electrically.

The mere fact that a considerable number of magnets may be required makes no difference. Adding units cannot add trouble if the units themselves do not make trouble. If it is possible to build an electrical controlling apparatus that will work unfailingly in one place, the same principles can be applied in other places.

It seems probable that the present trend in the use of electrical apparatus that complete electrical control will include a switchboard or keyboard within the circle of the steering wheel rim, carried as are the controllers of existing systems. A perfectly practical braking control would include a small controller lever, operated, say, by the thumb, and having a range of movement of perhaps two inches; the first half inch would energize the clutch magnets and throw out the clutch, an automatic governor at the same time curbing the tendency of the engine to race. Further movement of the controller would increase the pressure on the service brakes, and then throw in the emergency brakes. A quick sweep of the lever would throw the clutch out and both brakes into action exactly as if both pedals were pressed in a car in which the service brake and clutch were interlocked.

There certainly is much that is attractive in the idea of driving a car that is fitted with "complete electrical control." The driver sits at his ease and does no more arduous work than is involved in the handling of the steering gear. Gear shifting is reduced to the mere pressing of a button, and even this may be half done in advance by pressing the button of the next gear that will be required and, when the time to change arrives, merely pressing the clutch button to make the actual change. Approaching a sharp turn and with the car at speed, all the work is done with one thumb; the clutch is thrown out, the service brake applied with a force that is dependent upon the swing of the little lever, and the automatic governor takes care of the motor while the clutch is out. If the motor stalls, there is a button to press which instantly starts it. If the motor is unable to run, or if fuel is exhausted, the starting motor will propel the car for a considerable distance—far enough, say, to find help or fuel or a place for the car.

Incidentally, the storage battery will be an important part of the "complete electrical control" and, while it doubtless will be found advisable to make it somewhat more capacious than the starting and lighting batteries now in use, it can be so amplified without greatly increasing its weight—and in any case 150 pounds or so is very little to an average car and a great deal in a battery. Moreover, batteries are improving every day, growing more efficient and powerful, pound for pound, and it is safe to say that trouble from this source is quite unlikely.

Complete electrical control seems certain as a development of the near future, for if a man does not want to crank his motor, or change his gears, neither does he desire to pull at his brake levers or kick his clutch out.

BICYCLES, MOTOR CYCLES, AND PARTS IN THE CENSUS

Statistics for the bicycle, motor cycle and parts industry are presented in a bulletin issued by Director Durand of the Bureau of the Census, Department of Commerce. It was prepared under the supervision of W. M. Steuart, chief statistician for manufactures.

The number of bicycles made decreased from 1,182,691, valued at $23,656,487, in 1899, to 250,487, with a value of $3,740,923, in 1904, and 233,707, valued at $3,228,189, in 1909, while the output of motor cycles increased from 160, valued at $33,674, in 1899, to 2,328, valued at $359,180, in 1904, and 18,628, with a value of $3,015,988, in 1909.

The evolution of the bicycle from primitive and unserviceable types to a useful and attractive means of travel may be said to have taken place between 1868 and 1890; and its perfection and standardization into practically one form of structure, the modern "safety" between 1890 and 1895. During this latter period the popularity of the bicycle became so wide-spread that the industry grew very rapidly, but after about 1897 it began to decline.

In 1889 there were 27 establishments engaged in the industry, which gave employment to an average of 1,797 wage earners and reported products valued at $2,568,326. At the census of 1899, after the industry had begun to decline, the average number of wage earners was nearly ten times and the value of products more than twelve times as great as in 1889.

During the five-year period ending with 1904 the industry declined very rapidly. The number of establishments decreased from 312 to 101, or 67.6 per cent.; the average number of wage earners from 17,525 to 3,319, or 81.1 per cent.; the value of products from $31,915,908 to $5,153,240, or 83.9 per cent.; and the value added by manufacture (value of products less cost of materials) from $15,123,857 to $2,525,094, or 83.3 per cent.

A considerable recovery of the industry as a whole is indicated by the statistics for 1909. While the number of establishments in that year shows a decrease from the number in 1904, the average number of wage earners increased 1,118, or 33.7 per cent., and the value of products, $5,545,327, or 107.6 per cent. The most important factor in the renewal of activity in the industry has been the growing demand for motor cycles.

The average number of persons engaged in the bicycle and motor cycle industry during 1909 was 5,017, of whom 4,437, or 88.4 per cent., were wage earners. Of the total number of persons engaged in the industry only 3.3 per cent. were females. Of the establishments reported in 1909 about half were operated by individuals. The value of the products of such establishments, however represented only five per cent. of the total value reported. Nearly all of the business is done by establishments under corporate ownership.

As already stated, the industry was declining at the census of 1899, yet more than 1,000,000 bicycles were made in that year. The output in 1904 was barely one-fifth as great and there had been a further decline by 1909. No tandem bicycles or tricycles for adults were manufactured in 1909, although their manufacture had been reported at the two preceding censuses. On the other hand, the development of the motor cycle branch of the industry has practically all taken place within the decade 1899-1909, and more particularly in the second half of the decade.

Wood-working Shop

WOOD WORK AND WOOD-WORKING MACHINES

In the machine shop many operations formerly done upon the lathe, planer, shaper, etc., are now done partially or wholly with the grinder and with much greater ease, accuracy and speed. Similarly, in the carriage and repair shop when the stock to be finished is not unsually long a drum and disc sander may be used to such good advantage that the hand planer may be sometimes omitted. Of course, it is true that a sander cannot surface a piece of lumber as the hand planer may; but it is also true that saws, cutters and planers do not finish the stock—rather they get it ready for the sander. Since the hand planer does not usually finish the operation, the sander is necessary; unless it is preferred to spend much time finishing the work by hand.

Surfacing is a very small part of the work which may be performed by the modern hand planer. In fact almost any shop may use the hand planer and shaper to good advantage. But when these machines are not available it has proved a very good method to prepare the stock with the band saw or table saw and the common hand tools, using the sander generously in producing a good finish.

A common difficulty met with in employing many methods, the description of which sounds good, and in using new machines which are good, is the effort required to produce and maintain the proper conditions. For instance, the band of the saw may be broken and the sander out of condition, so that it would require less effort to do the small repair job with the hand tools only, rather than to fix up the machines. Thus the good mechanic in the small shop, during the busy season,

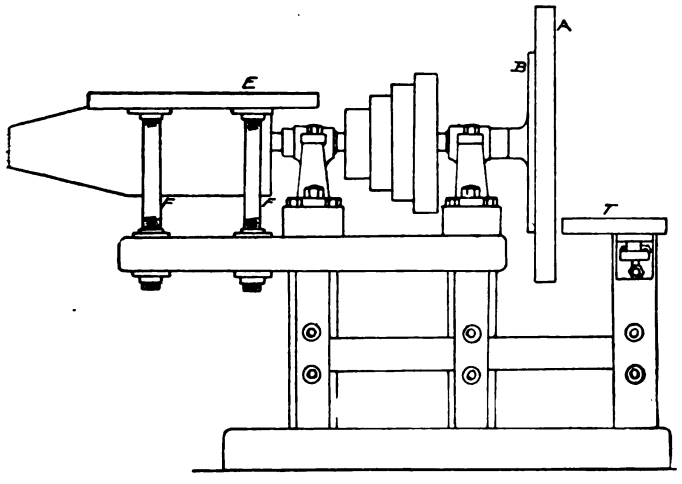


Fig. 1—A drum and disc sander for the wood shop

sometimes lets his equipment run down until it is about on a par with "Tom Tardy's." No doubt the best way to provide for mechanical difficulties is to fix it so the difficulty cannot arise. The drum and disc sander is a very simple machine; and when provided with a suitable number of interchangeable drums and discs for the work in hand no particular difficulty is experienced and not much time is required in order to set up the machine for the work. Owing to the fact that sheets of sandpaper of suitable grades may be purchased from the jobbers in sizes as required, the work of preparing the abrading surfaces is very much reduced, it being necessary only to apply a coat of glue to the face of the drum or disc (glue may be applied to the back of the sandpaper as desired), then press the sandpaper evenly into position.

The grades of sandpaper should be chosen to suit the work: No. 1½ to No. 2½ may be used for fast grinding, while it is necessary to use No. 1 and finer for finishing the work.

There are a number of discs and drums upon the market provided with means for clamping and holding the sandpaper without the use of glue. These improved parts are necessarily more expensive than the simple discs and drums employing

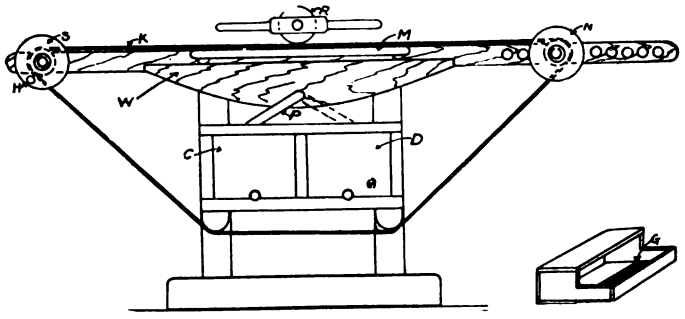


Fig. 2—The success of a sand-belt machine depends greatly on the efficiency of the belt. Fig. 3 shows a sanding riddle

glue to retain the abrasive material; and while many of them produce good results there is still opportunity for improvement in this direction. Perhaps some of the other readers have developed something special along this line, writes A. C. Gough, in American Blacksmith, to whom we are also indebted for the cuts.

The speed of the sander is limited by the heating of the work. This renders it better practice to employ step-cone pulleys for driving the sanding machines—very much after the manner of the wood turning lathe. The limits between which the speed of the abrading surface might vary may be taken between 1,500 feet and 4,000 feet per minute, depending upon the pressure between the work and the abrading surface.

The drum and disc sander and face plate lathe, as illustrated by the accompanying drawing, Fig. 1, is designed along lines which may render it easy of construction in the general repair shop. An effort is made to employ the material in the best manner, using material which may usually be in stock. When desirable, the head stock, step-cone pulley and face plates of a good size lathe may be used. This method would not require very much machine work, further than putitng in a longer shaft to carry the drum.

It will usually be desirable to possess a number of face plates, B. The discs, A, may be built up of light, strong wood and secured to the face plate by means of wood screws or bolts and nuts—the nuts being sunk. The edge of the disc, A, may be turned true and also used for certain work. The long drum, somewhat tapered at one end, should be built of light, strong wood upon a threaded iron core. The core or sleeve should extend well into the drum, being threaded at the interior end. the shaft fitting the hole in the sleeve snugly and with the end threaded to match the threads in the sleeve.

In order that the machine may be used as a table drum sander, a table, E, may be provided. The table is supported by four upright wrought iron pipes, F, F, upon which it is secured. The lower flanges which secure the pipes to the

frame may be arranged to be turned with a special spanner wrench. It is not considered necessary to provide other means for the small vertical adjustment required.

It will be found better practice to cover the surfaces which carry the abrasive material first with rubber, spongy leather or felt. If this is done the abrasive material will not peel off so quickly, will not heat in spots so readily and the work will have a better finish. If a number of discs and drums are provided—necessary for the suitable grades of abrasive material—the too common difficulty of not having a machine ready when wanted for use may be avoided.

The table, T, may be secured upon the upright pieces by a bolt at each end with hand nuts, as shown. When it is desired to use the machine as a face plate lathe the table, T, may be replaced by a table less wide, upon which may be secured

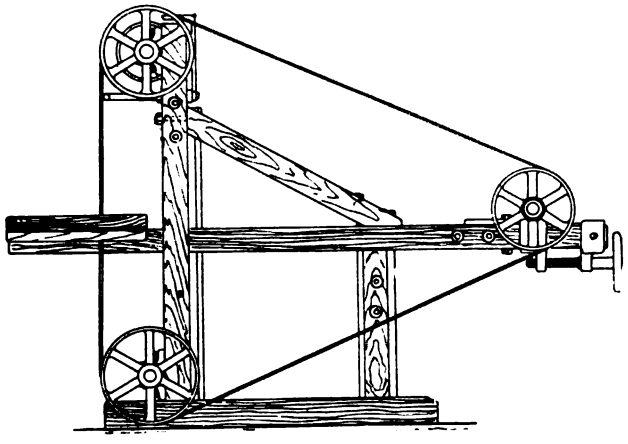


Fig. 4—Here the features of the vertical and horizontal belt sanders are combined

(in a slot provided) a lathe rest. By having the table and the rest slotted, any necessary adjustment may be secured. It would be necessary to allow some space between the table and face plate, in order to provide room for the work.

This common difficulty of keeping machine tools in the proper condition for use is rather greater in the case of the belt sander. This is especially true when the common method is employed. For instance, several years ago the writer consulted a firm of jobbers and engineers regarding the use of a belt sander and was informed that the common and practical method of preparing the abrading belt consisted of the following operation: Apply glue with a brush to the canvas belt, sprinkle the abrasive material upon the surface covered with glue and then spank the abrasive material into the glue with a thin board. When the belt is completed in this way it should be allowed to dry for a few hours.

It is not with the intention of casting the blame upon anyone else for the difficulties met with in applying the above method; but the advice permitted the use of machines which had no provision for the easy and convenient removal of the abrading belt. Two machines resulted that were made without this provision, which rendered this method of finishing carriage wood work rather unpopular in that particular shop. First, the bottom of the riddle being too large, a portion of the crushed quartz was wasted; second, the operation of spanking in the material is rather tedious and not altogether satisfactory; third, the glue became too hard unless the belt was used enough to wear out the abrading surface in a few days.

The first experience to discourage was when starting up the machine on one occasion there was a shower of crushed quartz in that vicinity. It was found that this was due to using glue which set too hard, and also to the high speed of the belt. A proper glue was obtained and the speed of the machine was lowered, which made it possible to use the machine with fairly good results when the abrading belts were in fit condition.

These experiences went far to convince one that in introducing new methods and machines it is a good idea not to omit too much. In fact, machines are often not used—entirely neglected—because no provision has been made for keeping them in working condition. In this connection the scheme, illustrated in Figs. 2 and 3, is offered for preparing the surface of abrading belts.

The apparatus consists of a frame which supports a trough, W, directly over which is a table, M. At the ends of the frame are two spools, S and N. Provision is made for adjusting the position of one of the spools when preparing belts of various lengths. For the operation, the belt is placed over the spools and table as shown at K; glue may be applied to a portion of the belt, which may be brought into position over the table by turning the spool by means of the handle, H, when the abrasive material may be applied by means of a riddle and fixed in the glue with a hand roller. This roller, R, may be of hard cast iron or other material and should be provided with a frame suitable for handling with one or both hands.

The purpose of the trough, W, is to catch the abrasive material which misses or falls off the belt during the operation. The trough may be fitted with a piece of rubber hose, P, which may be placed over the cabinet, C, or D, as may be desired. When compartments such as C and D are arranged for the different grades of abrasive material required, the rubber hose or other means may be used to direct the surplus abrasive material back into the compartment designed for that particular grade. In fact this is only a suggestion, as the

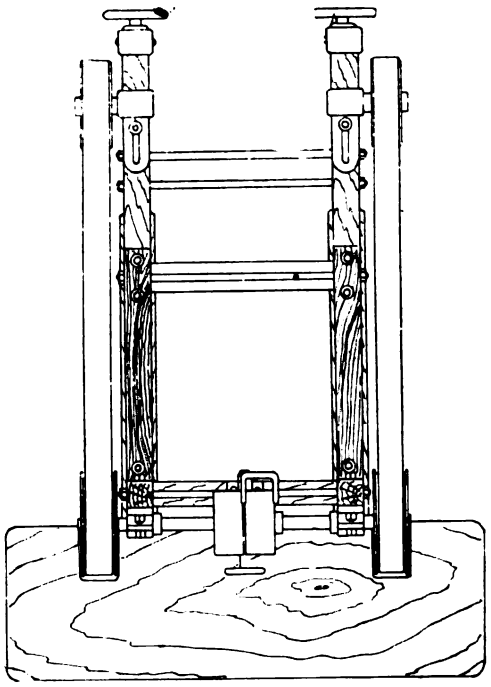


Fig. 5—The machine may be constructed to use but one belt, although it is better practice to employ two belts

supporting frame may consist of a cabinet with compartments for the different grades of crushed quartz, emery, glue, belts, etc.

When it is desired, drums and wheels may be coated with crushed quartz or emery by first giving them a coat of glue and then rolling them along in the trough, W, which should be partly filled with the grade of abrasive material desired. In this case it would be necessary to make provision for removing the table, M, and for closing up the opening in the bottom of the trough. It should not be forgotten that it is necessary to make provision for emptying the trough by elevating the bottom opposite the opening and to elevate the bottom of the compartments upon three sides, not including

that of the opening. When nothing better is desired, the openings of the compartments may be simply round holes, closed by wooden plugs.

Fig. 3 illustrates a cheap, but (it is believed) the best form of riddle for this particular work. It may be constructed something like a light, strong box with one quarter and the side opposite removed; the side being replaced by a screen, G, of the proper mesh. When carried vertically the box holds the material just as any box might do, but when turned over, as shown, the abrasive material flows out over the screen and falls upon the belt. The box may be made such that the screen is about the same width as the belt, so not much of the abrasive material will miss the belt when in use.

While the form of auxiliary apparatus has not been used, so far as is known at this writing, it is believed that in conjunction with a sufficiently large number of belts, etc., it will largely remove the common difficulty referred to elsewhere.

The design shown in Figs. 4 and 5 combines the features of the vertical and horizontal belt sander; only it is necessary to place the table somewhat lower than is usual with machines in order that the more nearly horizontal portion of the belt may not be too high for convenient use. The machine may be constructed to use only one belt, but it is better practice to employ two belts, one for fast grinding and one for producing the finish. It is better, also, to provide one or more duplicate belts, in order that one belt may always be ready for use.

The machine is shown with tight and loose pulley for driving, though it may be considered desirable to use step-cone pulleys instead.

The material selected and the manner of employing it has been done with the view of the machine being constructed in the repair shop.

VARIOUS WOODS AND FILLERS

Open-grained woods require paste filling, being "hard woods." Ash, beech, butternut, baywood, black walnut, chestnut, elm, mahogany, oak and rosewood.

Close-grained woods are filled with liquid fillers, being soft woods. Bass, cedar, redwood, gum, poplar, spruce and whitewood.

There is another group of woods that occupy an intermediate place though they might properly be classed with the close-grained woods, namely, birch, cherry, circassian walnut and maple. They are sometimes filled with paste filler, sometimes with liquid filler.

Chestnut and some oaks are very open-pored and not only require paste filling but often two fillings and a stiff paste. The purpose of the paste filler is to fill up the openings in the tissue of the wood, the liquid part of the filler saturating the tissue and so to some extent preventing the wood robbing the varnish coat and occasioning pin-holing, etc. For this purpose it is sometimes best to apply a coat of liquid filler over the paste filling, and in some instances another coat of paste filler over the liquid is best. In any case the idea is to form a hard and impermeable foundation for the varnish coats that are to follow.

A filler should be colored to match the wood; but should be made a shade or so darker. The following is a very good formula for making a paste filler: Mix 2 parts of best coach japan and 3 parts of raw linseed oil, both by weight. To this liquid add enough finely pulverized silica to form a stiff paste. If this can be run through a hand mill all the better. The thorough mixing of the mass should be accomplished in some manner and the mill does it better than the stirrer or paddle. Then add such pigment as desired for color.

There are several substances used for fillers, such as terra alba or China clay, talc, asbestos, barytes and carbonate of magnesia. The fault with these is their fading out or whitening in the wood. There is nothing to excel pulverized silica. Cooked starch makes a good transparent filler, and some prefer it because with it the work may be rushed; such a filler is soft and easily applied, and that is about the most that can be said for it. It does not hold up the varnish well. One of its advantages is that it will hold up well in the pot, silica settling badly unless kept constantly stirred. Silica also dries out too rapidly; but this fault may be corrected by the addition of a little raw linseed oil, which will also cause it to work much easier.

Corn-starch filler seems to fill wood perfectly, but as it dries and hardens it shrinks badly and leaves the wood only partly filled. The natural result of this is seen in the varnishing, in pinholes, checks, etc. Also it should be noted that corn-starch filler requires more time for drying than it usually gets, and hence the varnish is apt to crack over it.

A good transparent filler, where cooked starch is not desirable, may be made by mixing together 8 ounces of corn starch and 8 ounces of very fine pumice stone powder, to which add ¼ gill of white shellac varnish and the same quantity of boiled linseed oil. Mix thoroughly and thin up to proper consistency for use.

A white liquid filler is sometimes desirable, and the following is a good one: In 1 gallon of raw linseed oil put 2 pounds of pale powdered resin, and place in a suitable vessel on the stove until the resin has melted, stirring meanwhile. Then remove from the fire and add 1 pint of white japan dried and 2 quarts of turpentine; stir well, then set aside to cool; when cold, stir in 8 ounces of corn starch. After which thin it with turpentine and pass it through a strainer or hand mill.

Cooked starch filler is made in this manner: Mix together 1 quart each of raw and boiled oil, gold size japan and turpentine. Boil some corn starch and add to it some magnesia, say, one-fourth as much as there is corn starch, or somewhat less. Boil the mixture, the starch and magnesia, for fifteen minutes at least, then add it to the liquids, and add any coloring desired. Of course a transparent filler needs no color. Silica may be used in place of corn starch if so desired.

Ordinary corn starch paste filler may be made from this old formula: To 1 pound of corn starch add ½ pint of boiled oil, the same of shellac varnish and 8 ounces of fine pumice flour. Mix well together and add any coloring necessary. It is found best to color all paste fillers to suit the natural color of the wood.

SOME IDEAS ABOUT BODY BUILDING

The chassis to be used for commercial work could be modified much more than it is. Both inside and outside improvements, or at least convenient changes are possible.

A closed body of the panel variety when it has an entrance other than the front one, has a door at the back. This is very good, and answers most purposes, but suppose a sliding side door were made just behind the driver, so that the interior could be entered from the vehicle when drawn up alongside the foot walk of the street, would it not be more convenient than stepping out into the mud to open the back door?

If the delivery wagon had two attendants it would also help the driver to more easily keep his eye on the interior and its contents while a delivery was being effected. The loading and unloading could also be finished in shorter time.

Meat, both large and small parcels, like a quarter of beef or carcasses of mutton, etc., are usually packed up on the straw-covered floor of the inclosed body. A well stayed body could be fitted with transverse rods and hooks so that the meat could be hung, and these could be made to slide so that the packing could be as close as needed. They could also be made detachable if the body part was needed clear for some different purpose. This plan could easily be worked out, and its merits might sell a wagon body.

But the body builder seems to wait for the customer to do all the planning and suggesting. He advances no suggestions as to possible new arrangements, but it would be profitable to do it.

There is hardly a trade that uses a delivery service that could not have made body improvements that would simplify service and make it quicker and easier.

The needs of users should be studied and owners should receive suggestions, not be always compelled to make them.

Even the undertaker's wagon could be improved much to better serve its purpose. It is always hung too high for easily inserting or removing the bodies it must carry at times. But whoever saw a low-hung body on such a job?

About the only wagon bodies that have been developed along the line of their needs are the coal carrying trucks with their chutes and lowering and hoisting apparatus. It was a great time before this innovation was accepted; now it is the common thing. And it had to come by way of the patent office the first time.

It would seem that there are many plans that might be suggested for improving efficiency. They would be a good subject for the body builder to think about.

HOME MADE BODY MAKING TOOLS

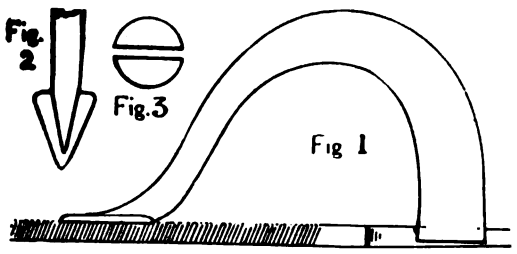
Tools play a very important part in the art of body making, and the best work is turned out by men of skill who have equipped themselves with the right tools. Anyone earning his living at a trade should endeavor to get the most out of it, and to do so it is necessary to study details. If a tool will aid you procure it at once, for the result will be a better job done more quickly.

Not a little care and experience are required in the selection of tools, because one should not hamper himself with a lot of useless and out of date things. The idea is to have as few as possible, but at the same time good serviceable tools to use for each part of the work.

A Handy File Handle

A handy file handle for holding the file when filing off screw heads in beading or panels and on flat surfaces is here shown. It holds the file firmly and is easily adjusted, can be used on flat or half round files with equal advantage.

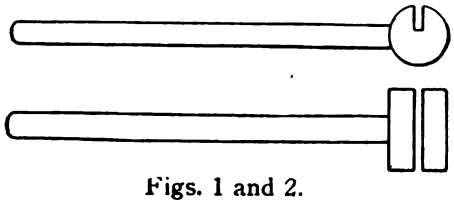
A blacksmith can forge it in a few minutes. Fig. 1 measures 6½ x 3½ in. Fig. 3 shows the diameter (one inch) and the tapered groove where the shank of the file is held. Fig. 2 is



the part bearing on the file shown the other way. The groove for the shank is important, and should be cut square in off the face to a depth of ¼ in. Face the end of the handle and scribe the shank on it, then cut with a hack saw to the depth and chip out the thin piece left with a narrow cold chisel. The file shank is just jammed in in the same manner as an ordinary file handle.

Bodymaker's Lapping Sets

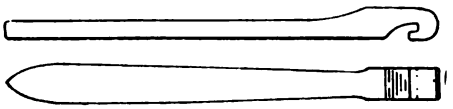
When putting on door lapping one often finds that it requires to be set off to clear when the door is being closed. For that



Figs. 1 and 2.

purpose several kinds of tools have been devised, two of which are shown drawn from lapping sets in daily use. One is for straight work, and the other for setting lapping going round corners and quick sweeps.

Figs. 1 and 2 illustrate the first mentioned, which is made with a piece of iron 1¼ in. long by ⅞ in. round, into which is screwed a piece of ⅜ in. round steel to form a handle. A



Figs. 3 and 4.

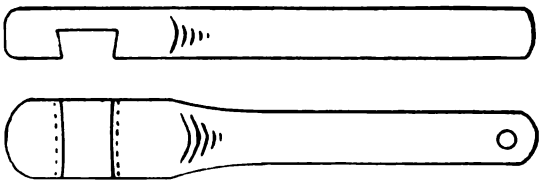
groove ⅜ in. deep by a full ⅛ in. is cut in one side lengthwise with the head, in which a good grip is obtained.

Figs. 3 and 4 is another set for use where a narrow one is required. It is made from a piece of ½-in. square steel drawn down lighter for the handle. A notch shaped to grip the lapping is cut as shown.

Tool for Bending Beads

A handy tool for bending beading is quickly made from a piece of good hickory (for choice), but any tough wood will do.

Take a piece 16 in. long by 2½ in. by 1½ in. and cut a notch on curved lines across the face, making it wider at the bottom.



Dress off to form a handle and bore a hole to hang it up by.

This tool saves hammering the bead when going round short turns. The less the hammer is used the smoother the work.

GERMAN CRITIC ON BODY DESIGN

The following is a critical review by a German designer, comparing modern French and German body work, condensed from Cooper's Journal.

French landaulette design he finds far behind that of his own country. At the shows he found comparatively few examples of the type, and none of them came up to his ideal of what they might have been in elegance of outline and fine finish.

Cabriolets he finds more in favor, but in these, as in the landaulettes, he complains of lack of harmony in design, and poor finish.

Folding pillars, hinges, and fittings generally were in most cases badly needed.

The writer expresses surprise that "universal" bodies, as he calls them, should be in demand at all, having regard to the trouble and expense which are nowadays devoted to making cars elegant and beautiful. The "universal" type cannot be considered, he thinks, either elegant or beautiful, nor can they give any pleasure to their builders, for even if workmanship is perfect throughout—which is seldom the case in a car made presumably for cheapness—there are so many places where wear can take place that looseness and noise soon result, while the leather sags and looks creased and unsightly. Much preferable is it to have two separate bodies, one for winter and one for summer, or to have a detachable limousine top, the extra expense of which, he thinks, is fully justified by the extra satisfaction obtained.

Although with leather tops a perfectly smoothly outlined roof is hardly possible, the bulge of the hoopstick being always more or less visible, the writer found that the work was good, and he considers the idea justified by the end in view, i. e., the reduction of weight. Curiously enough he omits any mention of the question of the "drumming" noise so frequently found in limousines, and which the leather top eliminates.

The increasing use of the frameless window and the much

improved construction, is noted in contrast to what had been seen at the Berlin show only a year previously.

The critic is sarcastic on the extensive use of imitation cane, as seen in French built cars. They would not, he says, be possible in Germany, where its appearance does not find much approval, but, he goes on to say, its utility, in disguising defects in varnishing, or making joints invisible in a simple and rapid way, cannot be questioned. Perhaps that is why it is so much used.

Reference is next made to the unfashionable and out-of-date lines of the French touring cars, as compared with German practice; and as examples of good designing, Mercedes, Kellner, Benz, Bugatti, and Mathis firms are mentioned. The three-seated speed model of Berlanger is one non-German make which is favorably noted, as regards both style and finish.

The use of antique leather, and departure here and there from the conventional styles of trimming, are noted with approval. The increasing vogue of companions, built-in cupboards, and other items for increasing the comfort and luxury of the passengers, also receive favorable comment. In seating, the opinion is expressed that German firms have shown more enterprise by their wider adoption of the "club chair" type of seat. Occasional seats of the folding-up kind, which can be used to face front, side, or rear, are now practically universal, but some makers, who may have a particular eye to extreme neatness and simplicity, adopt a type which collapses into a recess formed behind the front seats, and which can only be used for the one fixed position for which they are originally designed.

In commenting upon closed cars he loses himself in an appreciation of German practice.

WOOD-WORKING MACHINES AND MOTORS

Electric drives are taking a prominent place and are proving satisfactory and advantageous over the old methods of drive which utilize long lines of shaftings, idler pulleys and belts.

Investigations of plants operating from line shafting and belt drive show that from 25 to 60 per cent. of the total power, when all machines are working, is used up in driving the belts and shaftings. This fact, when considered in connection with the fact that the average load in woodworking plants is only 10 to 35 per cent. of the total connected load, shows that the friction losses due to the shaftings and belts amounts to practically the greater part of the total energy used.

The electric motor largely eliminates such losses, for when a machine is standing idle no power at all is transmitted to the motor; when a machine is running light the motor takes from the line only enough power to overcome the friction losses in the driven machine plus the losses in the motor itself, which are well known to be comparatively slight; and the electrical losses in the transmission line, which in all well designed lines are so slight as to be comparatively negligible.

When a machine is in service, practically all the energy is available for performing the operation in hand. The foregoing points may be summarized in the unquestioned statement that the electric motor drive represents the most efficient method of securing the highest percentage, at the driven tool, of the initial energy developed.

The electric drive by direct economies in those charges debited exclusively to power and by increasing the product with a given equipment and personnel reduces the unit cost of the product.

Moreover, the quality of the product is generally improved where the electric drive has been substituted for belt drive from jack shafting, for good product from woodworking machinery is dependent upon a drive capable of transmitting even and constant torque to the cutting tool. The electric motor meets the requirements, for it will not quit readily, neither will it slow down appreciably on overloads, but will maintain a practically normal speed even if the power demand greatly exceeds the limit of the rated capacity of the motor.

It is characteristic of woodworking plants that the material handled is bulky; that is, a great bulk of material must pass over each machine in the course of a day. Where such conditions obtain, it is urgent that the machines be so arranged in relation to each other that the material be moved only the slightest possible distance in going from one machine to the next. The individual motor drive or combined individual and group drive in woodworking plants makes possible an arrangement of machines which secures the greatest possible output with any given equipment of floor space machines and men.

The economy to be effected by reduction of losses in transmission of power in woodworking plants to be secured by the electric motor will oftentimes merit a change to the motor drive, but the increase in output due to systematic arrangement of machines will generally be of even greater value in reducing unit cost of production and is in fact one of the strongest reasons for the adoption of motor drive in woodworking plants.

Another point of great advantage in favor of the electric motor drive, says A. T. Denizer, in Wood Craft, is the ability to move motor-driven machines to other locations in the shop either permanently or temporarily, as for instance, where the line of production is changed. Individually motor-driven machines lend themselves admirably to such change of location, for they are not dependent upon an installed line of shafting for power, but instead may be supplied with power from temporary wires which may be run practically anywhere with but slight labor and cost. In fact, motor-driven machines can be installed in places wholly inaccessible to a line shaft.

Where extensions to the plant are contemplated the motor drive is advantageous, for the location and arrangement of the new part of the plant is independent of the power layout of the original plant.

In this connection it might be explained that where mechanical transmission of power from one building to another is used, it necessitates the buildings being placed either parallel or end to end, for the bevel gear or angle belt turn necessary to transmit power from one building to another located at an angle to it are not practical.

Danger to operatives reduced by the elimination of shafts and belts.

Reduction of fire risk, often remarkably lowering of insurance rates due to possibility of having powerhouse located at a distance from the shops.

Better light on work secured due to elimination of shafts and belts.

Economical operation of individual machines or plant sections, when rush orders may demand overtime work in parts of the plant.

Both alternating current and direct current motors are used in driving woodworking machines. The direct current motor has advantages where wide speed adjustment is demanded. Exceptional conditions, therefore, may warrant the use of the direct current motor for driving woodworking machines; however, under the usual conditions, the induction motor is the better adapted.

Advantages of the induction motor: Occasional filling of oil wells with occasional inspection of oil rings to see that they operate properly is the only attention required; operate inherently at practically constant speed independent of ordinary voltage fluctuations or load, within limit of output; are light in weight and small in bulk for given output; possess remarkable ability to withstand violent peak loads; having no brush rigging or moving contacts, the squirrel-cage multiphase induction motor is immune to fire risk.

CUT CAR PRICES IN NEW YORK

One of the most active dealers in new and used autos along "Automobile Row" began a new policy in motor car selling. He will sell autos at cut prices and on the installment plan. Both trucks and pleasure vehicles will be handled in this way.

GRADING WOOD STOCK

The Hardwood Manufacturers' Association has issued grading and inspection rules that were effective in May. The rules are the same as those effective with the spoke manufacturers and the National Wagon Manufacturers' Associations.

We give publicity to those that should be the most often referred to by all having to do with vehicles.

Hickory Vehicle Wheel Stock

Rules for Grading Rims

Very dense growth is a growth in which the non-porous part of the annual ring covers three-quarters of the area of the annual ring, and the remaining one-quarter contains a small number of pores.

A dense growth is one which the non-porous portion of the annual ring occupies at two-thirds the area of ring, and is slightly more porous than the very dense growth and accordingly that timber which contains a less per cent. of non-porous growth and a larger per cent. of porous growth, is representative of a lower grade of timber.

Blemishes

A blemish is that which, while marring the appearance of the timber, does not affect the strength of the timber.

(a) Stains—A stain is a discoloration caused by improper care or handling, by improper piling, and by being left in the weather or on the ground during the warm or wet seasons.

(b) Iron Streaks—An iron streak is supposed to be caused by the infiltration of foreign coloring matter through bird pecks, and when it shows but slightly, apparently does not affect the mechanical qualities of the timber.

Bird Pecks

A bird peck is a slight defect caused by the bird pecking a hole in and through the bark of a tree, into which there settles foreign substances that discolor the timber, and when showing slightly, apparently does not affect the quality of the timber.

Bastard Rim

A bastard rim is one in which the growth or annual rings do not run parallel to the tread of the wheel.

Cross Grain

A cross grain piece of timber is one in which the growth or grain of the timber does not run parallel to the center line of the piece.

Sound Knot

A sound knot is one in which the wood is as solid as the wood surrounding the knot.

Short Curve or Dip in the Grain or Growth

A short curve or dip in the grain or growth is a curvature or deflection caused by a knot.

Snarl

A snarl is a twisted grain or growth in the wood.

Grub Holes

A grub hole is a hole about one-quarter inch in diameter caused by grub worm boring a hole, usually lengthwise to the growth of the timber.

Powder Post

A powder post piece of hickory timber is caused by a very small worm that continues to work in timber after it has been cut, seasoned and even manufactured into the finished vehicle. While his work does not frequently appear on the outside, the inside may be entirely reduced to powder—hence the term "powder post.'

Worm Holes

A worm hole is a clean open hole about one-sixteenth inch in diameter, and is easily visible, caused by a bug usually working in partly seasoned timber.

Sun Check

A sun check is a season check caused in seasoning and usually takes place in the best quality of timber. In some instances these checks are so very small that they do not impair the use or strength of the timber, and should be used at least in the lowest grade.

Rim Inspection

"A" Grade

"A" grade is the first and highest grade. In rim strips of sizes 1½ inch square and smaller, the timber must be all white, of very dense growth, straight grain and free from streaks, stains and all defects; in sizes larger that 1½ inch the timber may be either all white, or part red and part white mixed, of very dense growth, straight grain and free from streaks, stains and all defects.

The red timber in these large sizes must not exceed one-half the size of the stick.

"B" Grade

"B" grade is the second grade and must be practically straight grain of dense growth. Of all white and of red and part white and red timber. The red and part red and part white must be fully equal to or better in quality than the white in this grade.

All rim strips in this grade must be free from all defects.

"C" Grade

"C" is the third grade and must be medium quality of either white, red, or red and white mixed timber. This grade will admit of timber of good quality not admitted in the "A" and "B" grades on account of cross grain, and all slight blemishes such as iron streaks and stains, but that are equal in strength to the clear strips of this grade.

Cross Grain—The grain shall not run in the length of the strip at any place at a greater angle than one inch in eighteen.

Short curves or dips in grain not to be included in this grade.

"D" Grade

"D" grade is the fourth grade. The timber in this grade, although clear and straight grain, of white or red, or white and red mixed, is of a weight and quality not admitted in higher grades. Also strips of higher quality of timber equal in strength with the straight grain strips in this grade, but with blemishes, such as iron streaks and stains, and defects such as knots and bird pecks that are sound, also cross grain, provided the grain shall not run in the length of the strip at any place at a greater angle than one inch in twelve.

Short curves or dips in the grain with a length of less than four inches and more than ⅜ inch in depth will not be admitted in this grade.

Curves running longer than four inches and dips deeper than ⅜ inch would be considered cross grain.

"E" Grade

"E" grade is the fifth and lowest grade, consisting of strips that can be used, but such as are not admitted in the higher grades on account of quality of timber and defects. Strips with slight season checks should be used in wheels of this grade.

Strips with defects such as powder post worm-eaten timber, open defects such as grub holes, checks, splits, bird pecks, snarls and otherwise unsound, and very brash timber such as has practically no fiber and strength will not be admitted to this grade.

Wagon Stock

Standard Dimensions

The following dimensions given are the sizes adopted by this association for rough materials in the green state (unless otherwise specified) and are those in common demand by our members.

The star (*) prefixing any size indicates that that size is more in demand than the unmarked sizes.

Axles—Hickory

(6 feet long)

2¾ x 4¾	3¾ x 4¾	*4½ x 5½
*3 x 4	*4 x 5	*5 x 6
*3¼ x 4¼	4 x 5½	5½ x 6½
*3½ x 4½	4¼ x 5¼	6 x 7

Grading and Inspection Rules

Adopted by the National Wagon Manufacturers' Association.

No. 1 or Wagonmakers' Grade

Grade—Live, tough black or shell bark hickory, cut 6 feet in length, to include all the clear and perfect stock.

Defects as follows admissible:

Stain—Pentrating not more than 1/16 inch and which has not developed into a rotting condition.

Knots—Four sound pin knots not exceeding ¼ inch in diameter, or two sound knots ¾ inch in diameter near the center line longitudinally on top or side and not over 12 inches of center or more than six inches of ends. Knots (except pin knots) not to be closer than 12 inches apart.

Splits—On either end, extending not more than six inches in axle or three inches on both ends.

Season Checks—Not more than ½ inch deep and not more than 12 inches long.

Hearts or Heart Rings—None.

Shakes—That will plane out with ⅛ inch cut.

Worm Holes and Grub Holes—Not more than two pin worm holes not nearer than six inches to each other.

Bird Pecks—Bird pecks allowed if sound, or if unsound, part is not to exceed ½ inch in diameter and not over ¼ inch in depth.

Wane—Axles with wane will be measured excluding the wane.

Sap—Bright sap considered no defect.

Grain—Grain can cross three inches in entire length of axle.

Defects Removable—If defects not admitted can be cut out so as to reduce axle to a smaller size used and ordered by the buyer, it shall be so inspected.

Hewn axles shall be measured to square to the size they are ordered.

Maple Axles

(Sizes same as Hickory)

No. 1 or Wagonmakers' Grade

(These rules have not been adopted either by the wagon manufacturers or mills, but are suggested as being fair and equitable to both.)

To be cut from live, tough, hard maple (no bird's eye or curly maple admitted), cut 6-foot and 12-foot lengths to include all the clear and perfect stock. Defects as follows admissible:

Stain—Penetrating not more than 1/16 inch and which has not developed into a rotting condition.

Knots—Four sound pin knots not exceeding ¼ inch in diameter, or two sound knots ¾ inch in diameter near the center line longitudinally on top or side, and not over 12 inches of center or more than six inches of ends. Knots (except pin knots) not to be closer than 12 inches apart.

Splits—Splits on either end, extending not more than six inches in the axle or three inches on both ends.

Season Checks—Not more than ½ inch deep and not more than 12 inches long.

Hearts or Heart Rings—None.

Shakes—That will plane out with ⅛-inch cut.

Worm Holes and Grub Holes—Not more than two pin worm holes not nearer than six inches to each other. Not more than two grub holes that will penetrate more than six inches at either end of the piece.

Bird Pecks—Bird pecks allowed if sound, or if unsound, part is not to exceed ½ inch in diameter and not over ¼ inch in depth.

Wane—Axles with wane will be measured excluding the wane.

Sap—Bright sap considered no defect.

Grain—Grain can cross three inches in entire length of axle.

Curls—None; 12-foot lengths to be inspected as two 6-foot lengths.

Defects Removable—If defects not admitted can be cut out so as to reduce axle to smaller size used and ordered by the buyer, it shall be so inspected.

Bolsters—Hickory or Oak

(Length 4 feet 1 inch and 4 feet 6 inches or multiples.)

3 x 4	3¼ x 4¼	3¾ x 5½
3 x 4½	3¼ x 5	4 x 5
3 x 5	3½ x 4½	4 x 6
3 x 7	3¾ x 4¾	

Rules

Grade—To be cut from good, tough, straight-grained oak or hickory (when oak is specified it will be understood as being white or red oak) suitable for wagon material. To be clear and perfect stock, excepting the following defects, which will be admissible:

Stain—Penetrating not more than 1/16 inch and which shows no signs of rot.

Knots—One sound knot not over ½ inch in diameter, not more than 12 inches from the center of the piece, or three sound pin knots not exceeding ¼ inch in diameter located in same manner.

Splits—None.

Season Checks—Not more than ½ inch deep and not more than 12 inches long.

Heart Rings—None.

Shakes—If they can be planed out with ⅛-inch cut.

Worm Holes—Not more than six pin worm holes in a bolster, these holes not to be in cluster or more than three holes, six inches apart.

Bird Pecks—Allowed if sound.

Wane—Will be measured excluding the wane.

Sap—Bright sap accepted.

Grain—Grain can cross two inches in length of bolster as maximum.

Defects Removable—If defects not admitted can be cut out so as to reduce bolster to a smaller size used and ordered by the buyer, it shall be so inspected.

Sand Boards—Hickory or Oak

(Length, 4 feet 1 inch and 4 feet 6 inches or multiples.)

2¾ x 3½	*3 x 4	3½ x 4½
3 x 3½	3¼ x 3¾	*4 x 5
	*3½ x 4	

Rules

(Same as Bolsters)

Reaches—Hickory or Oak

*2 x 4	8 feet and 10 feet long
2 x 4½	8 feet and 10 feet long
2¼ x 4½	10 feet, 12 feet and 14 feet long
*2½ x 4½	10 feet, 12 feet and 14 feet long
2½ x 5	10 feet, 12 feet and 14 feet long

Rules

Grade—To be cut from good, tough, straight-grained oak or hickory (when oak is specified it will be understood as being white or red oak) suitable for wagon material. To be clear and perfect stock, free from knots, splits, hearts, grub holes, heart rings, shakes, bird pecks or wane. Bright sap accepted. The following defects will be admitted:

Stain—Penetrating not more than 1/16 inch and which shows no signs of rot.

Season Checks—Not over ¼ inch deep or 12 inches long.

Worm Holes—Not more than six pin worm holes in a reach, these holes not to be in clusters of more than three holes, six inches apart.

Poles—Ash or Oak

(For Drop Poles)

*2½ x 4 x 4 x 4	—12 feet
2½ x 4½ x 4½ x 4½	—12 feet

(For Stiff Poles)

2½ x 2½ x 2½ x 5 —12 feet
2¾ x 2¾ x 2¾ x 5 —12 feet
3 x 3 x 3 x 5 —12 feet
3¼ x 3¼ x 3¼ x 5 —12 feet

Rules

Grade—To be cut from good, tough, straight-grained oak or ash (when oak is specified, it will be understood as being white or red oak), suitable for wagon material. To be clear and perfect stock, free from knots, splits, hearts, grub holes, heart rings, shakes or bird pecks. Bright sap accepted. The following defects will be admitted:

Stain—Penetrating not more than 1/16 inch and which shows no signs of rot.

Season Checks—Not over ¼ inch deep or 12 inches long.

Worm Holes—Not more than six pin worm holes in a reach, these holes not to be in clusters of more than three holes, six inches apart.

Eveners—Hickory

2 x 4	4 ft. 2 in. long	2¼ x 4½	4 ft. 6 in. long
2 x 4½	4 ft. 2 in. long	2½ x 5	5 ft. 6 in. long

Rules

Grade—To be cut from good, tough, straight-grained hickory suitable for wagon material. To be clear and perfect stock, free from knots, splits, hearts, grub holes, heart rings, shakes, worm holes, or wane. The following defects are admissible:

Stain—Penetrating not more than ½ inch and which shows no signs of rot.

Season Checks—Not over ¼ inch deep or 12 inches long.

Worm Holes—None.

Bright Sap—No objection.

Bird Pecks—Sound bird pecks admitted.

Turned Singletrees

Oval Diameters

	At Center	At Ends	Length
Light	2 x 2½ in.	1½ x 1⅝ in.	34 and 36 in. long
Medium	2¼ x 2¾ in.	1⅝ x 1⅞ in.	34 and 36 in. long
Heavy	2½ x 3 in.	1½ x 2 in.	36 in. long

Turned Neck Yokes

Diameters

	At Center	At Ends	Length
Light	2½ in.	1½ in.	40 in. and 44 in. long
Medium	2¾ in.	1⅞ in.	40 in., 44 in. and 48 in. long
Heavy	3 in.	2 in.	44 in. and 48 in. long

No adopted rules for grading single trees and neck yokes, but stock must be absolutely clear and made from young, tough hickory.

Sawed Felloes—Oak

(26 pieces to set)

The sizes given are for green felloes cut full.

Sizes Most Common

1¾ x 2½	2¾ x 2¾	2½ x 3
2½ x 2¾	2¼ x 3	4½ x 3
*2 x 2¾	3¼ x 2¾	3¾ x 3

Circles, 2 ft. 11 in. and 3 ft. 6 in.; 3 ft. 2 in. and 3 ft. 10 in.; 3 ft. 6 in. and 4 ft. 2 in.

Rules

Grade—Sound white or red oak, free from knots and other defects, except that 1 1/16 inch stain will be allowed if said stain shows no sign of rot. Must be manufactured so that grain will run straight through the center of each piece. Cut full sizes and proper circles.

Bent Rims

(8 pieces to set)

The sizes given are for green rims

Sizes Most Common

1¾ x 1¾	3 x 2	4¼ x 2¼
2 x 2	3¼ x 2⅛	5 x 2
2¼ x 2	4 x 2	5¼ x 2¼

Circles 3 ft. 2 in. and 3 ft. 10 in.; 3 ft. 6 in. and 4 ft. 2 in.; 3 ft. 10 in. and 4 ft. 6 in.

Grade

Wagon Manufacturers' Grade

(To replace what was formerly XXX)

These rules agreed upon jointly by the Wagon and Rim Manufacturers, November 21, 1906.

Materials—Oak (any desirable species).

Quality—Clear and straight-grained, but not excluding reasonably straight, the grain not to cross the rim in a less distance than 24 inches; to be sound, free from bark, wane, checks (except checks on tread side), shakes, splits, knots and worm holes, but admitting not more than three small, sound knots, not more than ½ inch in diameter on tread side; also small worm holes not closer than 6 inches apart. Not over 15 per cent. of any shipment of rims shall be with knots or worm holes as above specified.

Workmanship—Planed on top and bottom sides; no skips, tears or imperfect planing. Bending to be on the true circle of diameter specified. To be free from flats or humps, kinks, breaks or buckles, and no straight or drop ends.

White Oak Wagon Spokes

(Wagonmakers' Grades)

Rules

Second Growth Grade

Material—Spokes of this grade are to be made from first quality timber, practically clear and straight-grained, of heavy weight and very dense growth that will indicate the very greatest strength.

Defects

Checks—Small fine season checks not to exceed 2 inches in length and not running into the shoulder admitted.

Splits—None admitted.

Cross Grain—Grain which does not run at a greater angle at any one point than 1 inch in 24 inches admitted. Curly spokes are considered cross-grained and not admitted.

Knots—Spokes having knots will not be admitted, but spokes showing a small sound spot having the appearance of a knot, but which is only a surface blemish, will be admitted.

Sap—Half sap that is bright and sound admitted.

Bastard—Not more than three-fourths bastard will be admitted.

Other Defects—Evident defects not above enumerated not admitted.

"A" Grade

Material—Spokes of this grade are to be made from live timber of dense growth, good weight, practically clear and straight-grained.

Defects

Checks—Small, fine, season checks not to exceed two inches in length and not running into shoulder admitted.

Splits—None admitted.

Cross Grain—Grain which does not run at a greater angle at any one point than 1 inch in 20 inches will be admitted. Spokes reduced from the second growth grade by reason of cross grain will be admitted in this grade when the grain does not cross at a greater angle than 1 inch in 18 inches. Curly spokes are not admitted.

Knots—Knots will not be admitted, but spokes showing a small, sound spot having the appearance of a knot, but which is only a surface blemish, will be admitted.

Sap—Half sap that is bright and sound admitted, but when of the second growth grade or very dense growth reduced by reason of having too much bright sap, will be admitted to the extent of two-thirds bright sap.

Bastard—Not more than half bastard will be admitted.

Dips—Spokes having dips not more than one in a spoke and located anywhere except at shoulder or tenon admitted, provided such dip is not more than ¼ inch in depth and not less than 4 inches in length.

Other Defects—Evident defects not above enumerated not admitted.

"B" Grade

Material—Spokes of this grade are to be made from timber of a weight and growth that will indicate fairly good strength.

Defects

Checks—Small, fine, season checks, not to exceed 2 inches in length and not running into the shoulder admitted.

Splits—None admitted.

Cross Grain—Grain which does not run at a greater angle at any one point than 1 inch in 16 inches admitted. Spokes reduced from the second growth grade because of excessive cross grain, but in which the grain does not run at a greater angle at any one point than 1 inch in 14 inches, admitted.

Spokes reduced from the "A" grade for cross grain will be admitted to this grade if grain does not run at a greater angle than 1 inch in 15 inches.

Knots—Knots will not be admitted, but spokes showing a small, sound spot having the appearance of a knot, but which is only a surface blemish, will be admitted.

Spokes reduced from the second growth and "A" grades having one sound knot not over ¼ inch in diameter, showing only on one side, and not within 5 inches of either end of the spoke, admitted here.

Sap—Half sap that is bright and sound will be admitted.

Bright all sap spokes of second growth grade admitted.

Spokes from "A" grade having three-fourths sap admitted.

Bastard—Not more than half bastard will be admitted.

Spokes of second growth grade will be admitted in this grade where full bastard.

Spokes of "A" grade will be admitted in this grade where three-fourths bastard.

Dips—Will be admitted in this grade where not more than one in a spoke and located anywhere except at shoulder or tenon, provided such dip is not more than ¼ inch in depth and not less than 4 inches in length.

Worm Holes—Black and pin worm holes in either second growth or "A" grades of timber will be admitted here to the extent of not more than three in any spoke, but these must not be bunched. Powder post worm holes not admitted.

Other Defects—Evident defects not above enumerated not admitted.

Manufacture

The following suggestions are made to the manufacturers of spokes: There is complaint on account of poorly manufactured spokes, such as tearing in the barrel by the lathe knives or by the adjustment of the knives not being in line, making thick and thin places along the barrels; the grain pulled out; also, rough machine work in the throat, or on the tenon, by which the corners may be chipped off, the tenon not even thickness and not in the center of the spoke. There should also be great care taken in the facing of spokes, so that the face and the back are square with the tenon, and not diamond shapes, as is so frequently the case. Spokes should also be well sanded with a view of having them clean and smooth.

It should also be understood that all spokes made under the foregoing rules will be branded only "Second Growth," "A" and "B" respectively, and that in no case will the spoke manufacturer brand these grades higher or lower than they will inspect under these rules, nor will the wagon manufacturer request it. No restriction, however, is put upon the use of special brands.

PAPER BODIES

Macerated paper—papier mache—is being suggested as a material for vehicle bodies.

It is strong. It is light in weight, so would materially decrease the weight of a motor car body.

It has the advantage over any metal of lightness, while it would not be so quickly or generally put out of shape by dents, knocks or bruises as metal, especially aluminum.

It can be worked easily, and affords a good surface for color and varnish.

AMERICAN CARS ABROAD

From consular reports recently to hand we continue our account of the status and progress of automobiles of American make in other countries. This information is interesting.

The automobile industry is developing rapidly in Switzerland, the demand for medium priced touring cars and motor trucks is constantly increasing, and during 1912 the demand could only be supplied by Swiss factories after long delay. No important changes in the construction of the cars was announced, prices remained good, and the factories producing a certain type of car in large numbers report a profitable business. Exports of high grade cars, motor trucks, and motor cycles in 1912 amounted to $2,762,915.

England, which formerly furnished a profitable market for Swiss-made motor cycles, now imports very few of this class of motors, but to compensate for this loss of trade exports to southern Europe and South America have increased materially.

The Swiss factories were all busy during the year, especially those producing commercial cars and motor trucks, most of which find a market in the country. This particular branch of the industry is increasing rapidly, and many of the factories that formerly produced only touring cars are now engaged exclusively in the manufacture of heavy trucks and delivery wagons and hotel motor busses. The Swiss government is also a good patron of the motor industry, as large orders are being placed for motor vans for transporting the mails. There is also a demand for military motor transports in Switzerland and in other European countries.

Now the American Car in Switzerland

The invasion of Europe by the American-made automobile, which until a few years ago was denounced by the continental manufacturers as cheap and worthless, continues. The demand for American cars in the Swiss market is confined generally to those of medium or low price, as the European manufacturers have given little attention to the production of that class of machines.

Two years ago there were only two or three American cars in Switzerland, whereas there are now a great number of medium-priced machines in use in the Confederation, and the interest they are attracting and the popularity they have attained is not only a surprise, but cause for comment on the part of the dealers and manufacturers who have maintained that they could never compete with the European product.

The American automobile has taken its place beside the best makes of other countries, its efficiency and durability having been demonstrated by the severest competitive tests of speed and endurance. A feature of the American car of mdium price is the style and finish, which are superior to the cheaper grades of the European makes. They are also stronger and more durable than the cheap continental cars, being built for roads that are more trying, and which require the greatest strength and elasticity in spring and movement to withstand severe strains, a circumstance which guarantees to the car a much longer life and more satisfactory service when utilized upon the excellent roads in most of the European countries.

About 50 American automobiles were sold in Switzerland within the past year, and agencies have been established in several places in the Confederation for the exclusive sale of the medium-priced motors of American make. The time is opportune, and the popularity of the cars already introduced is evidence of the fact that Switzerland offers a good field for the exploitation of American automobiles.

Slow in Italy

The automobile industry had a prosperous year in 1912. Exports increased and the home demand was good. At the close of the fiscal year ending June 30, 1911, the number of automobiles in use in Italy, including 392 trucks for transporting merchandise, was 11,119. With an increasing produc-

tion in Italy and a large importation of foreign cars it is safe to say that to this figure may be added another 3,000 in use at the present time.

There has been a considerable demand for American cars of light weight and low price and recently for those of medium price. The oportunities for increasing trade in American automobiles are good, as is indicated by a number of requests made of the consulate general during the year by persons desirous of handling American cars of this class. A car costing the agent here about $1,200, including transportation and duty amounting to about $200, should meet with a fair demand.

Ireland Likes Our Cars

As the statistics of the imports and exports for Ireland for 1912 are not yet published details of the volume of trade here can not be given. Trade here, however, moves regularly in certain well-defined channels, and there is seldom any marked change to record. As far as can be learned American trade with this country is gradually increasing.

This is specially true regarding the trade in motor cars, a large proportion of the cars now in use here being of American manufacture. This branch of trade, if properly handled, should develop considerably, both as regards pleasure cars and commercial cars. The present policy of most American manufacturers of appointing a British agent for the whole of the United Kingdom is apparently a mistake. It greatly increases the price of the cars, while at the same time discounts allowed to local agents are cut down to a very low figure, and naturally the agent is inclined to push the sale of a car on which his profit will be higher.

NEW FREIGHT TARIFFS

Supplement No. 1 to J. A. Ryan's Northbound Rail and Water Class Rate Tariff No. 1 (I. C. C. 45) will become effective July 10, 1913. This tariff carries class rates from local and junction points in Georgia, North Carolina, South Carolina and Virginia to Boston, Providence, New York, Philadelphia, Baltimore, Washington and Alexandria, Va. Supplement 1 contains all changes.

New York Central and Hudson River Railroad Co.'s tariff, I. C. C. B-15594 (Exceptions to Official Classification) has a new supplement No. 20, effective July 1, 1913, which contains all changes.

Supplement No. 20 to West Shore Railroad Co.'s I. C. C. B-6357 (Exceptions to Official Classification) became effective July 1, 1913.

M. P. Washburn's Carolina Tariff No. 5 (I. C. C. No. 93) has a new supplement, No. 6, effective June 11, 1913. All changes are contained in supplements 5 and 6. Tariff I. C. C. No. 93 carries joint and local freight rates on classes and commodities from Ohio and Mississippi River crossings to local and junction points in Georgia, North Carolina, South Carolina and Virginia.

Supplement No. 1 to The Pittsburgh and Lake Erie Railroad Co.'s "Exceptions to the Official Classification," tariff No. I. C. C. 1495, became effective July 1, 1913. Supplement No. 2 has also been issued to take effect July 15. These will contain all changes.

Pittsburgh, Lake Erie and Western Railroad Co.'s tariff I. C. C. 1374 shows rates on Classes Live Stock and Commodities from stations on P. & L. E. R. R., B. & O. R. R., Monongahela R. R., Montour R. R., P. R. R., P. C. & Y. Ry, and West Side Belt R. R. to various points in eastern United States and Canada. This tariff has a new supplement, No. 35, effective July 1, 1913.

Pittsburgh & Lake Erie Railroad Co.'s I. C. C. 1383 ("West Bound" Joint and Proportional Freight Tariff B, No. 1250) has a new supplement, effective June 6, 1913. This tariff covers class rates, including rate bases applying from stations on Pittsburgh & Lake Erie R. R., Baltimore & Ohio R. R., Monongahela R. R., Montour R. R., Pennsylvania R. R., Pittsburgh & Moon Run R. R., Pittsburgh, Chartiers & Youghhiogheny Ry., and West Side Belt R. R. to destinations named therein in Illinois, Indiana, Iowa (west bank Mississippi River), Kentucky, Maryland, Michigan, Minnesota, Missouri (west bank Mississippi River), New York (western part), Ohio, Pennsylvania (western part), West Virginia and Wisconsin. This supplement cancels 15. Supplements 16, 19 and 20 are in effect and contain all changes.

Supplement No. 8 to E. H. Hinton's Southeastern Carolina Tariff No. 2 (I. C. C. No. A-58) became effective June 21, 1913. This tariff carries rates from points in Alabama, Florida, Georgia, Kentucky, North Carolina, South Carolina, Tennessee and Virginia, and between Athens, Ga., and Atlanta, Ga., and certain North and South Carolina points. Supplements 6 and 8 contain all changes.

Supplements 11 and 12 to Pennsylvania Co.'s tariff I. C. C. F-420 took effect July 1, 1913, and contain all changes from the original tariff. The tariff shows commodity rates from stations on the Pennsylvania Co., Ashland & Western Railway, Pittsburgh & Lake Erie Railroad, Pittsburgh, Lisbon & Western Railroad and Toledo Terminal Railroad to stations in Illinois, Indiana, Iowa, Kentucky, Michigan, Missouri, New York, Ohio, Pennsylvania, West Virginia and Wisconsin.

Supplement No. 14 to The Pittsburgh, Cincinnati, Chicago & St. Louis Railway Co.'s tariff I. C. C. P-422 will take effect July 15, 1913. This tariff carries rates on general commodities from stations on the P. C. C. & St. L. Ry., P. C. & Y. Ry., C. L. & N. Ry. and Pennsylvania Terminal Ry. to stations in Illinois, Indiana, Iowa (eastern part), Kansas (eastern part), Kentucky, Michigan, Missouri (eastern part), Nebraska (eastern part), New York (western part), Ohio, Pennsylvania (western part), West Virginia (western part), and Wisconsin (eastern part). Supplements 13 and 14 will be in effect at that time.

NEW DECATUR MIX-UP

Charges of mismanagement are made against Receiver H. H. Haines of the New Decatur Buggy Co., at Middletown, O., in the suit filed recently by the Buckeye Wheel Co. for the purpose of recovering a balance of $1,956 which is due itself for supplies furnished. It is alleged that though the receiver had authority from the United States Court to borrow and expend $5,000 for the purpose of carrying on the company's business, he in fact ran up an indebtedness of $34,365 in addition to borrowing $4,000 from bank, and that outstanding debts at present aggregate $9,833, while his available funds are only $4,070, so that after the latter is paid out there is in prospect a deficit of $5,764.

Another charge is that the receiver has not been paying in the proper proportion those creditors who have been supplying him with goods and merchandise to carry on the business, that he paid some in full, others nearly all and the Buckeye Company itself only 74½ per cent. of what was due it, and others still less.

It is claimed all his purchases in excess of $5,000 have been in violation of the order of the court and is characterized as negligent and wasteful mismanagement. The court is asked to require Receiver Haines to file a complete report and to hold him personally accountable for whatever may be due to merchandise creditors over and above what they get from the funds now in his hands.

Inquiry is also asked to ascertain what creditors have received more than their proportionate share on claims against the New Decatur Company, so that they may be made to refund whatever was paid them in excess.

C. W. FLANAGAN

This gentleman, who was for a long time connected with The Carriage Monthly, and was a familiar figure at trade conventions, died in Detroit, June 27. Mr. Flanagan had many friends in the trades he represented, and was a genial man.

Paint Shop

THE PAINTER AND THE BOSS

The accompanying cut is a likeness of W. A. Riggleman in his working togs, and the paint shop he loves so well. This is one of many of the paint shops in which I have worked —in fact have worked all over the United States in all kinds of shops and conditions and with all kinds of shop owners and bosses. You get into lots of bad shops, bad stock and tools; paint rooms not fit to work in, and six or seven months' work in a year. No wonder small shops have a time getting and keeping a painter. A shop owner should guarantee the painter so much money, work or play. It is not the painter's fault if he has not got the work. If the boss can not do that, get out of the paint business, or turn your paint shop over to the painter, free rent, or for taxes and insurance. Six hundred dollars a year a painter should have at the least to "get by" on. It is a poor shop that cannot repaint 100 jobs at the average of $10 apiece. At that many of the bosses or shop owners would get $400 for the use of shop and stock. It's the other repairs the paint shop brings that makes it pay. But as a rule they think of no one but themselves. The time will come when all garages or automobile repair shops will have paint shops in connection with same. They should be made big enough to repaint automobiles and carriages. Then give the paint shop to some good painter, free rent, then help him get work. Then see if you can not keep him. In my next article will tell a good way to repaint an automobile or carriage. In this article I am just telling you where you have your trouble with your painter. It is very easy to stop on your part and you lose nothing by it, and you get the good will of the painter and his friends. W. A. R.

PRACTICAL TESTS OF GLUE

Much has been said of late about the testing of glue, its value and adhesive qualities, different grades and makes. Several rules and regulations have been devised to determine the exact value of each glue which are all very good. Nevertheless, most of these tests can only be made with the aid of special appliances made for this purpose.

With this fact in mind the writer (R. O. Neubecker, in Wood Craft) gives a few simple rules to determine qualities of glues. First of all, the odor of glue is always considered a good indication of quality. The best grades of glue have a not too pleasant odor but the cheaper grades are practically obnoxious. Usually the cheap bone glues are easily detected through their rank or nasty smell and can be thus judged for their quality in their dry state. Particularly is this true of the powdered or ground variety.

Another test for ground glue is by taking a handful and closing your hand over it. If it gets sticky within a minute or two it is a cheap kind, or made of bones, etc. A good hide glue usually retains its brittle nature for quite a while without getting sticky.

A fact worth mentioning is that cheap ground glues always will be found to lump or pack together in warm weather. Flake glue will act in most instances the same way as ground glue. Another test for flake glue is to take a piece and try to break it. If it breaks easily and with a brittle crack it is a sign of cheap glue. On the other hand if it proves elastic and can be bent back and forth and is hard to break, it is of a much better quality.

When a piece of good glue is held against the light it should show a perfect clearness and even texture. A cheap glue will show streaks and appear cloudy.

Glue, however, should not always be judged by color, as some of the best glues are of the dark colored variety.

That white glue is stronger in adhesive qualities than the natural color is an error, as the white glue is always found to be colored with mineral pigments. White vitriol or oxalic acid and oxide of zinc are most commonly used for this purpose. This is done solely for the purpose of providing a white colored glue which in some trades is absolutely necessary. The mixing of any coloring matter has never been found to increase the adhesive quality of the glue.

Glue may be tested for quality as follows: A thin sheet must bend until both ends touch without breaking. If after breaking a sheet of glue the fracture appears in splinters then such glue has not been cooked properly. If the sheet breaks readily then the glue is weak in binding quality and low in value.

The surface of good glue should be velvety, but sometimes dust falls upon the damp glue, imparting a matty appearance.

Never purchase glue that has been exposed to moisture, nor glue that emits an odor similar to that of dead animals. Irregular bubbles noted in melting glue, when of large size, prove that the material from which such glue was produced had been in a state of decay. If, in cooking, glue of this sort emits a noxious stench it is unfit for use. Even when soaking this glue before melting the disagreeable odor may be noticed. Further proceedings with glue of that peculiarly objectionable odor would only prove to be a waste of time and money, because such glue when used for veneering or glue jointing will blister or come loose in a short time after or joints come apart when such glue is decaying.

COMBINING PAINTS FOR EFFECT

Mr. Hillick, whose practical ideas on all that pertains to the varnish room seems to be very well received, thinks the time is coming when motor car bodies will be painted in the quiet tones distinctive in the horse-drawn vehicle. The noisy colors so much at present affected will be robbed of the noise. Then he continues in this practical strain:

In choosing a combination of colors for the car it is a mistake to attempt to introduce too many colors. Two or three are about as far as one should go for the body of the car, while one color, supplemented, of course, by the striping color, should invariably suffice for the chassis.

In making effective combinations of colors for the automobile it will at times be necessary to use common sense methods and good judgment, avoiding any combination that approaches an offense to the color instinct possessed by every man who is not color blind. Any one of the popular grays if employed in connection with a combination of colors in which a promi-

nent blue reigns conspicuously should have a bluish tone, or cold hue. If a bright red were the conspicuous color in the combination the gray should have a warm, reddish tone.

A neutral gray, or a gray made out of white and black will harmonize with any color. Black will do the same thing. It is a mistake to suppose that a color that always harmonizes with any color, or any set of colors, will with such colors produce combinations pleasing to the eye.

Harmony of color, if nothing more is wanted, may be more accurately obtained by varying a certain color to divers shades and tints. Green, if shaded to a darker hue or cast to a lighter tone, will develop harmony through either change. So likewise the blues. In the preparation of gray pigments the most thorough mixing is necessary, otherwise there will be streaking out. Especially is this true of a gray in which more or less black is used. The best practice in making up a soft, neutral gray is to beat the white to a creamy paste, and the black to a like consistency, and then add the black to the white gradually, meanwhile beating the mass vigorously. A very intimate mixture of the two pigments being obtained, proceed to add turpentine until the proper consistency is secured.

Not infrequently a very harmonious combination of colors may be had without getting enough brilliancy into the effect to please the average person. This difficulty is often overcome by the choice of bright striping effects, or by changing some one of the field colors either to a bright or a more subdued shade. Small spaces of green or blue or maroon or brown in contrast to large spaces of black are not pleasing.

Change the ratio of color, making black play a very small part in contrast to a very large part played by the green and blue, and the combination will pass on as an altogether pleasing and effective one. Blue and green panels on the car body are intensified and rendered more beautiful when the moldings are colored black. Dark green panels are given a contrasting effect by striping with lines of deep red. Finer lines of deep red, like No. 40 carmine, for example, may be used on fields of blue for a contrasting effect, although as a rule either lighter or deeper blue than that employed as the field color, used to line the surface will give more beautiful color effects. Lines of black on the medium deep blue field give a very handsome effect.

MOTOR BODY VARNISH

The proportions to which the motor body industry has attained has created a demand for special high class varnishes, with the result that we have today qualities which are a great improvement on the productions of years ago.

Perhaps the most important point is that varnish shall be as clean and colorless as possible, for, if it is tinged with yellow or brown it may injuriously affect the value of the colors on which it is laid. This more especially applies to such colors as blues, lakes, whites and the like. But in the case of darker pigments, on the other hand, such as umber, sienna, etc., a dark varnish is rather an advantage as it tones these down to a richness that is highly pleasing. It is not necessary, however, to keep dark colored varnishes for this special purpose, as the same effect can be obtained by making a "glaze," i. e., by adding 25 per cent. of the desired color to one of the varnish coats.

FOR CLEANING UPHOLSTERY AND TOPS

The recipe for cleaning and renewing leather upholstery is good enough to bear repeating. Raw linseed oil and turpentine mixed in proportion of two of the former to one of the latter is the time honored formula. For cleansing cloth upholstery use clear water and a mixture of three-fourths of an ounce of common salt and two ounces of either grain or wood alcohol, simply rubbing the cloth with a sponge dampened in the above mixture.

THE GREAT FIELD FOR CHEAP ALCOHOL

It seems nothing short of extraordinary, in view of the agitation that has been caused by the increasing cost of gasoline, that so little attention has been paid to the possibility of burning alcohol in the cylinders of automobile motors. The present trend toward kerosene is strongly marked, and alcohol is almost out of sight in the background.

Of course, there are disadvantage in the use of alcohol. Gasoline motors of average compression will use double the quantity of fuel, power for power, and present alcohol prices would make fuel bills of unwieldly proportions, to say nothing of tanks. On the other hand, an increase of compression enormously increases the efficiency of alcohol, a motor having sufficiently high compression using the same quantity of fuel per horsepower hour as a gasoline motor, but being capable of developing some 30 per cent. more power. Alcohol is one of the cleanest liquids imaginable, not only in its ordinary condition, but in combustion. It is a safer liquid to handle than gasoline and, in fact, its influence on the insurance situation alone is tremendously far-reaching. Last, but not least, alcohol can be made from almost any sort of vegetable matter and, under proper conditions, at very low cost.

WHAT AN ASSOCIATION TRADE MARK IS

The German Reichstag recently passed a law regarding the registration of trade marks by associations of firms or individuals, which is a distinct innovation. The new form of trade mark, called an association trade mark (Verbandszeichen), is more or less in line with similar provision in the laws of a number of other countries. The new law was expected to be in force by May 1, 1913.

These trade marks may be entered, according to the new law, by associations having a legal existence and interested in trade, even if they are not themselves producers or purveyors of goods. The registering association must file with the Imperial patent office the name, headquarters, aims, list of officers, and authorized representatives of the association, and must specify who are entitled to use the trade mark, lay down the conditions for the use thereof, and outline the rights and obligations of those concerned in case of infringement. Any subsequent changes in the association rules on the use of the trade mark are to be communicated to the patent office. This information is to be accessible to all inquirers at the patent office.

In view of the fact that a large number of persons may use such a trade mark the fee for the association trade mark is higher than for ordinary trade marks. The cost of the application is 150 marks ($35.70); the renewal is 50 marks ($11.90). In case the first application is rejected, 100 marks ($23.80) is refunded.

REPUBLIC RUBBER MAN GONE

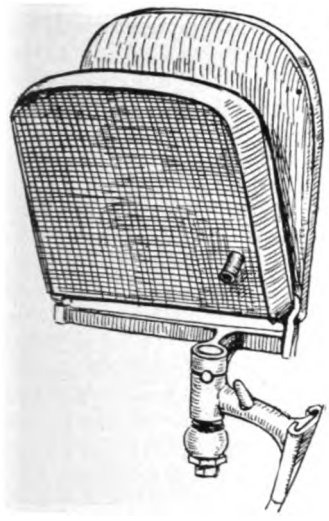
J. Walton Lyman, Philadelphia branch of the Republic Rubber Co., has been missing since April 28.

Accounts all right and business the same; habits good, so there is no known reason for the disappearance. Foul play is feared. He was last seen driving his auto—a Regal, license 5855, Pennsylvania.

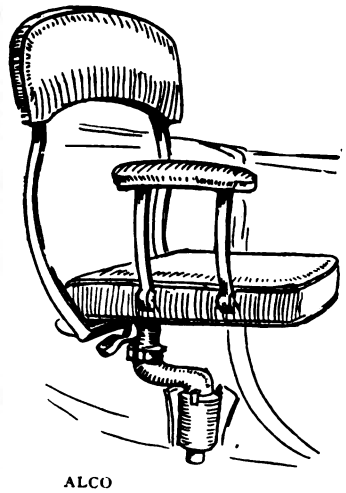
Information may be sent to H. W. Terry, Philadelphia Automobile Trade Association.

SKILL NEEDED

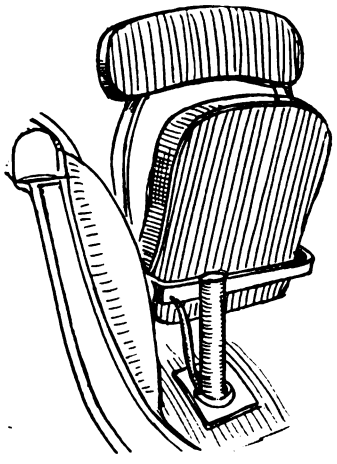
Varnishing is an operation that requires more skill than a superficial view of it would indicate, and it is just one of these points in which a few hours tuition by a man who is an expert at the job is worth pages of written description. The beginner will do well to practice for himself by making test panels.



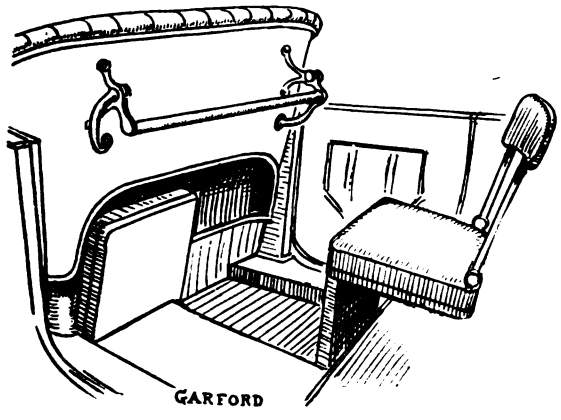
STEVENS-DURYEA



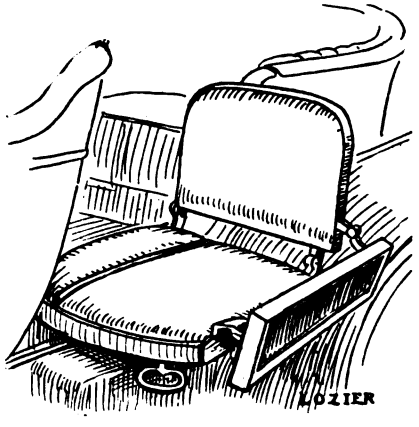
ALCO



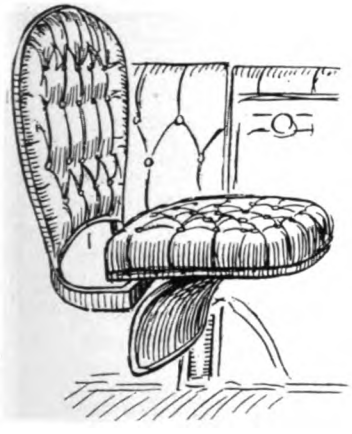
OAKLAND



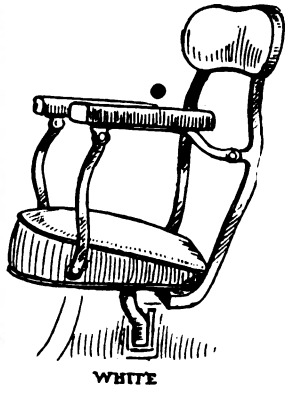
GARFORD



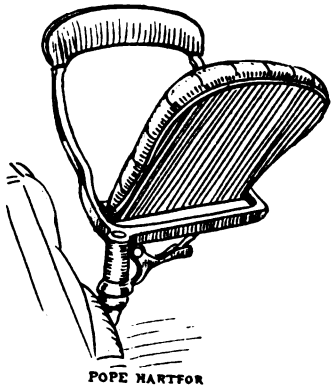
LOZIER



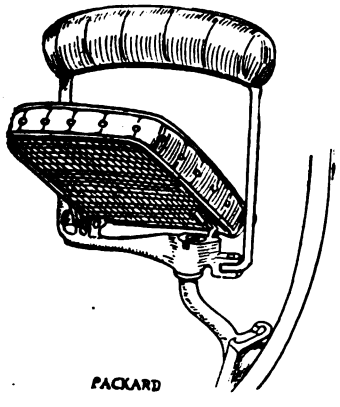
KNOX CONSTRUCTION



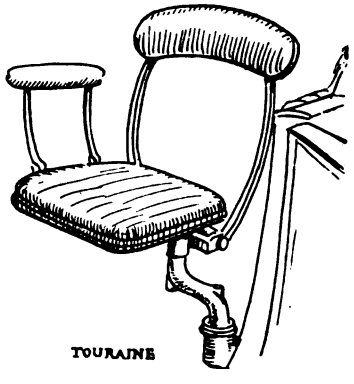
WHITE



POPE HARTFOR



PACKARD



TOURAINE

SPARE SEATS

The extra seat in a car is yet in an undeveloped state so will stand a lot of improvement. It is a difficult piece to manage, as it is in the nature of an interloper, after all, and the idea seems to be how best to make it comfortable, while tucking it out of the way when not in use. We give descriptions of the most successful efforts so far.

Packard—The back is skeleton with padded rest. Rigidly attached to swiveling frame. Seat tilts into vertical position and comes to rest under back rest. Normal, seat faces forward, a slot in top of pivot registers with slot in edge of socket and a lug on under side of seat drops into both slots. Chair must lock in its right position.

Garford—Seats fold into recesses in the floor and in the back of the front seat. They fold flush. The back folds down against the cushion and the whole swings forward and downward on a pivot at the foot of the front board.

Pope-Hartford—The method of attachment is like the Alco, but without arm rest. The seat locks only in the forward position.

Lozier—The Lozier is an outside seat for use of driver when some one else is at the wheel, etc. It is part of a door on left side of body on bottom hinges. A cushioned back and outside arm rest affords protection from spilling out. When the seat is not in use it is a door.

White—Is nearly a complete chair. Forward edge well upholstered, high back, padded arms. Folded, back pushes down against cushion of seat and arms double up automatically. When not in its rigid used position it can be raised, swung round and pushed flat against side of car just behind door. It is carried on a steel bracket slipping into a socket attached to body framing near the floor.

Touraine—About the same as the Alco.

Alco—Has an inside arm rest supported on two hinged members rising from edge of seat. With arm rest on inside and body rail on outside two supports are afforded. When folded, arm rest lies flat on cushion seat. The locking device is L-shaped pivoted under the frame, with long end horizontal and like a handle, short end pointing down with squared vertical edge which fits in the seat support. A spring forces the catch into the slots when seat is swung into any of the four positions pro-

vided for; upward pressure on handle releases catch and allows seat to swing back for folding.

Stevens-Duryea—Armless, with full cushioned back. Hinged to fold against back. When seat is swivelled into locking position a catch drops into a notch in the joint, showing position is right. Cushion is then dropped and a projection on the bracket enters a socket on the under side of the seat, holding it in place. The small catch is just a feeler or finder, which slight pressure releases when turning seat.

Oakland—Spare seat is carried on a post which rises from the floor. A spring handle parallel with the port, operates a plunger which enters notch in edge of socket, acting as a locking device to hold the seat facing forward. Seat is skeleton back, and can be lifted up and removed from car. The floor fitting hardly shows.

Knox—Back well cushioned. Mechanically similar to Stevens-Duryea. The leather flap shown covers hinges and metal work when seat is folded against body, and prevents apparel of passengers from catching. The flap is weighted.

CENSUS STATISTICS OF THE AUTOMOBILE INDUSTRY

Statistics of the manufacture of automobiles, including bodies and parts, in the United States for the year 1909 are presented by the Bureau of the Census, Department of Commerce. It was prepared under the direction of W. M. Steuart, chief statistician for manufactures.

The statistics of the automobile industry cover the operations of two classes of establishments: (1) those which manufactured complete automobiles as their product of chief value, and (2) those in which the greater part of the value of products represented automobile bodies and parts.

Of the 743 establishments engaged in the manufacture of automobiles, including bodies and parts, in 1909, only 265 manufactured complete automobiles as their product of chief value, but these establishments employed more than two-thirds of the average number of wage earners engaged in the entire industry.

The total value of products in the year 1909 for the two branches of the industry combined was $249,202,075, of which $193,822,108 was the value of products reported by the establishments engaged principally in the manufacture of automobiles, and $55,378,967 that reported by establishments manufacturing principally automobile bodies and parts. The total obtained by adding the figures for these two branches of the industry involves considerable duplication, however; probably a better measure of the actual value of the products of the automobile industry in 1909 would be the total value of the complete machines manufactured, which was $164,269,324.

Of the 126,593 automobiles turned out by establishments of the industry in 1909, all but 23 were made in establishments reporting complete automobiles as the product of chief value. In addition to the automobiles manufactured by establishments assigned to this industry, 694 automobiles were reported by establishments engaged primarily in the manufacture of other products.

Michigan the Leading State

Michigan was the leading state in the industry, holding first rank at the censuses of 1909 and 1904 in respect to the average number of wage earners employed, the value of products, and the value added by manufacture. In 1909 the factories in Michigan reported 33.6 per cent. of the average number of wage earners employed in the industry, 38.8 per cent. of the value of products, and 36.4 per cent. of the value added by manufacture.

The total number of persons engaged in the industry in 1909 was 85,359, of whom 75,721, or 88.7 per cent., were wage earners; 2,564, or 3 per cent., proprietors and officials, and 7,074, or 8.3 per cent., clerks—a class which also includes other subordinate salaried employes. Of the persons engaged in the industry in 1909, 82,918, of 97.1 per cent., were males, and 2,411, or 2.9 per cent., were females. The average number of children under 16 years of age employed as wage earners in the industry in 1909 was 162, of whom 159 were males and 3 were females.

Corporate Ownership

In both 1909 and 1904 more than five-eighths of the total number of establishments were under corporate ownership, the percentage being slightly higher in 1909 than in 1904. This group of establishments, however, contributed a much larger proportion of the total value of products in 1909 than in 1904, 94.6 per cent. as compared with 88.1 per cent. The proportion of establishments under individual ownership increased slightly during the five-year period, but the value of products reported for this group formed a smaller percentage of the total in 1909 than in 1904.

Of the 743 establishments reported as engaged in the industry in 1909, 56, or 7.5 per cent., had products valued at more than $1,000,000 each. The corresponding figures for 1904 were 10 out of 178 establishments, or 5.6 per cent. Although these establishments were relatively unimportant numerically, they reported a large proportion of the total value of products, the percentage for 1909 (68.4) being much larger than that for 1904 (46.6).

Of the automobiles turned out by establishments engaged in the industry in 1909, 95.1 per cent. were gasoline vehicles, the proportion being considerably larger than in 1904 (86.2 per cent.). The number of gasoline automobiles made in 1909 was more than six times as great as the number made in 1904. Steam and electric vehicles gained in number at a much less rapid rate, showing increases of 51.4 and 168.5 per cent., respectively, and each of these classes formed a smaller proportion of the total number in 1909 than at the preceding census. In 1904 more steam than electric automobiles were reported, but in 1909 the reverse was true.

Michigan was the leading state at each census in respect to both the total number and total value of motor vehicles manufactured. The automobiles made in Michigan, where the industry is largely centralized, represented 51.2 per cent. of the total number and 42.8 per cent. of the total value in 1909, and 42.1 per cent. and 27.6 per cent., respectively, in 1904.

Indiana and Ohio ranked second and third, respectively, in 1909 in the total number of automobiles produced, but in the value of the output Ohio was second and Indiana third. While less than half as many automobiles were made in New York as in Indiana, the value of all machines produced in the former state was practically equal to that reported for the latter.

More than half (64,262, or 53.4 per cent.) of the total number of gasoline automobiles and nearly half ($69,130,223, or 45 per cent.) of their total value was reported by Michigan in 1909. Ohio was the leading state in the production of electric and steam automobiles, reporting 37.6 per cent. and 81 per cent., respectively, of the total value of these machines in 1909.

Of the various classes of automobiles, the most important in point of numbers and of value is that of touring cars, the total number of such cars manufactured in 1909 being 76,114, with a value of $113,403,188, as compared with 7,220, valued at $11,781,521, in 1904. Such cars represented 60.1 per cent. of the total number and 69 per cent. of the total value of automobiles made in 1909.

The following table gives the figures in detail:

	Automobiles.		
	1909	1904	Per cent. of increase
Number of establishments..	265	121	119.0
Persons engaged in the industry	58,142	11,246	417.0
Wage earners (average number	51,294	10,239	401.0
Capital	$134,592,965	$20,555,247	554.8
Wages	33,180,474	6,178,950	437.0
Value of products.....	193,823,108	26,645,064	627.4

Smith Shop

TUNING UP WIRE WHEELS

Wheel building is the counterpart of tire inflating, and the art produces its best when sufficient tension to produce torque rigidity is combined with conditions that develop in the wheel a maximum cushioning effect. Such a wheel, by co-operating in the duties of the tire, lengthens its life and lessens its liability to wear, cuts, and punctures. To obtain maximum cushioning from a wheel of this type, moderate spoke tension needs to be combined with a flexible and resilient rim and thin spokes. This in its turn implies not only careful choice of materials, but appropriate design to neutralize the reduction of resistance to torque perpendicular to the plane of the wheel entailed by lightening the rim. Both the wheels of antiquity and modern artillery, and wheels for motor cars, owe much of their lateral strength to the high moment of intertia of their heavy wooden felloes, the disadvantage of which is their inflexibility and consquent inability to absorb shock. The Rudge-Whitworth wire wheel for motor cars is the first wheel in which these requirements were adequately met. This is done by making the outside spokes, that are much dished, enter the rim near its edges and not at its center, as was formerly considered correct. In this way members are provided to oppose the twisting of the rim due to sidewise shearing of the tire when rounding corners. It is only fair to add that this method of spoking has the effect of localizing the bending stresses, due to the pull of the tire bead, which at the same time strengthens the whole wheel very considerably.

There is another point of similarity between the wire wheel and a tire segment, according to the Automobile and Carriage Builders' Journal. If the radial compression on the tire walls gradually decreases owing to air escaping from the stressed condition, the flexed part of the tire will be increased, and a point arrives at which this has to be neutralized by inflating. Similarly, if the spoke tension of the wire wheel should fall the flattening of the rim would increase, and might even reduce the spoke tension to zero.

Though the great care exercised in choosing and maintaining the quality of hub-shell steel is necessary, still greater is that necessary in the choice and maintenance of suitable material, structure, dimension, and design for the spokes. This is required because of the variation of tension to which they are subjected. An alternating tension test is used to subject them to variations like those experienced by a spoke in a wheel. In addition to this, all consignments of spokes are tested for tensile strength, elongation, and contraction near the head and on the swaged part, and a longitudinal median section is examined microscopically to see if the pearlite grains have the dimensions that have been found most suitable. The microscope also detects undue internal strains set up during heading. Occasional analyses are made.

To check the accuracy of the initial tension on the spokes, wheels are taken at random from the stores, and the tension on each spoke is measured. To do this two spokes, one outside and one inside, are fitted into a hub, nipples screwed on, and a pull applied to the nipples in the testing machine. The pitch of the notes emitted at different tensions by the spokes when twanged is then compared with whistles and tuning forks. In this way a scale of tensions is found for each spoke which corresponds to a definite scale of whistle notes. The spokes in the wheels are then twanged and their pitch—and, therefore, tension—ascertained by these whistles.

The microscope has proved useful in controlling the spoke threads. The threads on Rudge-Whitworth motor spokes are not cut in, but rolled out of the metal. In this way the diameter and strength obtained at the base of the thread is greater, for the rolling process jumps up the metal, strengthening it by the cold working it gets. With the microscope, the actual displacement of the metal can be accurately followed by observing the positions taken up by the pearlite grains, and the degree of cold working at various parts of the thread can be gauged. Lines of weakness can be detected at once, as also imperfection in the outline.

The material from which the nipples are made has to be of high tensile strength.

The stresses to which rims are subject are complex. Load bends the rim, flattening it where the load is borne. This varying flexure will spread to the rim bead, making it bend and unbend to a slight degree. Another and more important case of the bead bending is due to the tendency of the cover to pull away. This is proportional to the air pressure and the radius of the air tube section. For a tire pumped up to 90 lbs. per square inch, and with an inner tube 4 inches in diameter, the force on one inch of the bead and perpendicular to it will be 180 lbs. This force will vary in magnitude, being greater near the ground and when rounding a corner, and will call into play transverse strains.

In testing rims, therefore, a section one inch wide is taken and tested by applying a pull to hooks made to imitate the bead of a motor tire, and the elastic limit and yield point recorded. The tensile strength, elongation, and contraction are determined of pieces cut transversely as well as lengthwise, and the rims are occasionally analyzed, tested for resistance to impact, and microscopically examined.

Although tires are somewhat outside the limits, the influence of the wheel on the tire is too close to omit reference to them. The rise of temperature of tires after a quick run is familiar to all. The hand cannot be held on the treads, cold water is converted into clouds of steam, and actual measurements on racing car tires show that at 135 km. per hour the temperatures reached by the cover and air tube were respectively 132 deg. C. and 96 deg. C. This is in part due to friction between the ground and the tire tread just as it is leaving and retouching the ground owing to the inequalities of the road surface, etc., in part to friction in the canvas or fabric, and in part (and probably in greater part) to the fact that when the stress in rubber is considerable, and its temperature is a few degrees above 8 deg. C., both extension and compression cause rise of temperature. As the temperature of the tire rises, the tensile strength of the rubber diminishes, and the energy stored in the rubber and not returned on leaving the ground increases rapidly. This not only leads to further rise in temperature, but to further softening, greater elastic hysteresis, and to increased resistance to the forward motion of the four wheels.

From measurements made, the loss for one tire may be as high as ½ h.p. The bearing of this on the construction of wheels is that the steel rim, which conducts much of the heat away, is, in the case of a wire wheel, able to leave its heat behind, whereas the wood felloe (which has only one fourteen-hundredth the conductivity of steel) insulates the rim of the wood wheel just where cooling is most needed.

CIRCUMFERENCES AND AREAS OF CIRCLES

The calculation of circumferences and areas is sometimes necessary both for the vehicle smith and the machine smith. And the automobile repairman will often find a table of circumferences and areas useful in calculating wheel circumfer-

ences and cylinder measurements. For example: such figures as piston displacement, the capacity of full tanks, gear ratios, must all figure from the basis of circumference or area.

To find the circumference of a circle with its diameter given, multiply the diameter by 3.1416; and to find the area of a circle with the diameter given, multiply the square of the diameter by .7854.

For circles larger than 13½, divide the diameter by two and multiply the corresponding circumference by two and the corresponding area by four.

For example: suppose we require the circumference and areas of a circle 20 inches in diameter. Twenty divided by two gives us ten. According to the table we find that the circumference of a 10-inch circle is 31.416—the diameter of a 20-inch circle will therefore be twice 31.416 or 62.832; and as the area of a 10-inch circle is 78.540 the area of a 20-inch circle will be four times 78.540 or 314.160.

SMITH SHOP TAKEN IN HAND

The smith's shop, even in the present days of system, shop management and efficiency, gets the least consideration.

Any place seems good enough for a blacksmith shop—down the cellar, some place where there is no fresh air and very little light, and a low roof where the smoke and gases hang.

To an employer, who has a good smith, and whose work goes on day after day and year after year without serious mistake, the smith seems to fill a small place. But let that smith leave and let some fellow less capable take his place, how they begin to take notice and to realize how valuable the other man was.

The trouble it seems is as much with the men themselves as with the employer. The smith gets careless when cutting off stock. He throws the scrap or cut-offs on the floor and lets them lie. That one thing helps to keep the smith and his shop in a poor condition.

The idea of a great many men is to have as much iron and work on hand as possible, so that the foreman or the employer may think that they are very busy. My experience is that a man who has been smart enough to fill the position of a foreman or employer is not so easily fooled.

There is not a foreman but who likes to see his shop nice and clean—everything in order and tools in place, so that the men may at a moment's notice proceed to turn out the work.

My ideal of a smith's shop, writes T. B. Gellathy, in American Blacksmith, although I have not been able to reach it yet, is the following:

First—A shop well ventilated and with plenty of light and room. Some manufacturers are advertising improved ventilating systems and are ready to prove that the firms who have had their systems installed have found the men turning out more work.

Second—The forges laid out on the plan best suited for the work to be done at each forge; near to the steam and trip hammers, as the work demands, and not placed close to the wall as is the usual custom. Put the forge in the center of the shop, if possible, so that the smith may have plenty of room to do his work.

If conditions necessitate that the forges be placed along the wall, have them five or six feet away from the wall. This prevents rubbish and scrap from being thrown behind the forge, and this space can be used for tool racks or perhaps a bench.

Third—Cranes form another important part of the shop, and placed between the heavy fires and the steam hammer they do away with the lifting and carrying of heavy stock. These, I think, are three of the most important items in the smith's shop.

As the days of apprenticeships are about past, as far as the manufacturers are concerned, the foreman or head of the department ought to specialize his men. Take a man and break him in on a certain class of work, let him have special tools suitable for his work. And have the tools marked with a number or figure, so the man may know his own and be held responsible for the tools.

If tools are marked in this way it gives the man more interest and pride in keeping his tools properly in order for his work.

In a place without system of some kind a man is inclined to borrow a tool and drop it at his feet, and even to let the next fellow dress it if he chooses.

Another time saver is to have the stock cut off at the saw or by some handy helpers at the spare fire and laid down at the forge. Then when a smith is finished with one job he can start right on the next.

Templates made of sheet iron are very helpful time savers. Or, better still, when the work is standard, have a sample forging, as some men can work from samples better than from drawings.

Some men are more skillful than others at handling the stock at the steam hammer and are able to turn out the work quickly. This fact can be profitably worked even in a small shop by having one man rough out the work and let the others, less capable at the hammer, finish the work.

Making blacksmith tools is also important. Have one man who is careful in heating and forging steel tools do this work and you get all the tools uniform in shape, weight and quality. You save time; thereby knowing exactly where the trouble is in breakages and you save yourself endless trouble and expense.

Marking the hammer tools is also a good idea. A pair of 1⅜-inch swages will look like 1½-inch when worn, and you cannot very well rely on measurement with the rule on the outside. As a result, a man depending on the swage instead of his calipers gets the job below size.

SCALE DRAWINGS

A scale drawing is understood to be a drawing which is absolutely proportionate in every detail, so that, if a drawing is quarter size, or 3 inches=1 foot, all the parts will be drawn one quarter of the actual size, so that if the edge of a board 4 feet long by 1 inch thick is shown, it would actually be drawn 1 foot long, and ¼ inch thick. If it were drawn 1½ inches=1 foot it would measure on the paper 6 inches by ⅛ inch. If in measuring up a drawing you found a line measured 3¾ inches you would know (if the scale was 1½ inches) that it represented 2 feet 6 inches (3 inches=2 feet, and the ¾ inch =6 inches), and if the distance between two lines was 3/16 inch it would=1½ inch.

A RUST-PROOF COATING

A new patent rust-proof coating for iron or steel is being used in England and is in the form of a paint that is applied to the surface of the article to be treated and is then baked. The following are the proportions of the ingredients by weight: Linseed oil, 25 parts; calcium resinate, 36 parts; manganese borate, ½ part; sugar of lead, 1 part; naphtha, 37½ parts; artificial graphite, 25 parts. The whole is mixed and applied to the steel or iron by brushing, dipping, or other procedure. The article is then baked at 300 degrees F. for a period of 1 hour and 40 minutes. It is stated that the coating is highly lustrous and is resistant to corrosive influences, but that no other form of graphite gives satisfactory results.

FIND THE TENSILE STRENGTH

If we knew what tensile strain a bar of any size will stand we can calculate what a bar of any other size will stand. Thus, if a bar of iron 1 inch thick and 1 inch wide will bear a weight of 20 tons tensile strain, then a bar 2 inches by 1 inch will stand 40 tons, and 2 inches by 2 inches will stand 80 tons, and 1 inch by ½ inch 10 tons, ½ inch by ½ inch 5 tons, and ¼ inch by ¼ inch 1 ton 5 cwts., and so on.

The tensile strength varies as the area of the cross section of the bar, or as the width multiplied by the thickness.

STEEL SPRING CORROSION.

Spring making does not rest alone with the proper proportioning of the plates and in knowing how to gauge the proper temper, but their curvature must be such individually that they work in harmony all together in their resistance to the weight, in the radii of the circles of which they are chords, so that they, like true soldiers in action, standing shoulder to shoulder, and each bearing its own part to the full extent of its power, and so as a whole perform the work required of them in solid harmony. This condition, when braced to those enumerated, can only give us a true and perfect working spring, so that those who advance that practical skill is alone responsible for the production of a perfect spring have only studied one side of the subject, and that its weakest, and have thus erroneously advanced this side as the strongest.

In springs where the plates are badly fitted, it is in the workshop the practice to run powdered ashes into the edges, and so fill up these defects, by the ash and paint, or grease used in putting the spring together, thus forming a stopper, but this soon works out, and not only spoils the color and varnish used in painting, but makes bad worse through the ultimate consequences of helping to create the rust it was meant to prevent. If technical knowledge is of any advantage in carriage building, there is no part in which it can be applied to better advantage than to the construction of springs, in which the nature of the material itself ought to be closely studied, so that ultimate results and consequences may be fully allowed for, and their effect worked out and accounted for in coming to a conclusive judgment.

The different varieties of iron and steel will not rust in dry air, or when wholly immersed in fresh water, free from air, but they will do so when exposed to the action of water, or moisture and air alternately. The rusting of iron is greatly prevented by vibration, so that springs from their action in lifting a load, together with the vibration traveling through them, coming from the road, have a tendency to prevent rust. The liability of iron and steel to rust in moist air is: Cast iron, 100; wrought iron, 129; steel, 133. Low shear steel corrodes more quickly than hard cast steel, and steel immersed in salt water at first corrodes more quickly than wrought iron, but its subsequent corrosion is slower, and the total corrosion after a long period of immersion is less than that of wrought iron.

Tempered steel is less effected by rust than the same steel twice annealed, and acidulated water dissolves cast iron more rapidly than steel. The alloys of iron and steel also act as generators of rust.

The density of iron, together with its smoothness of surface, has a deal to do with its corrosion. Rust does not attack a heavy, smooth piece of iron with such eagerness as a piece of thin plating, so that careful filing and bulk in coach iron work are helpful qualifications in resisting rust.

It is then evident that the inside surfaces of spring plates ought to be freed from scale, and not left as finished off the hammer. When spring plates are either ground or filed up, the inside surfaces of the plates should have all the scale cleaned off with the file before coating with oil paint.

It appears that the contact of iron with impurities renders it positively electrical. Forged iron rusts first on the lines of impurity occurring in it. It has been the custom in the trade to protect the inner surfaces of spring plates with paint and fat. These hold good for a while only, but when the fat by the absorption of oxygen from the air has become rancid, and in part changed into fatty acids, the tendency to rust is increased. We thus see that from the part which electric influences play in rusting of iron, it follows that those substances positive to iron which when in mere contact with it prevent it from rusting, generate the same if they are alloyed with iron, because such alloys are in general more positive than the iron itself. Thus manganese alloyed with iron promotes the tendency of the latter to rust. But association with electro-negative substances, such as carbon and phosphorus, diminishes the tendency to rust. It will thus be seen that the alloys of iron from which steel is made have much to do with the promotion of rust on its surfaces, and that steel does not rust so readily as wrought iron, and that the cause of the rusting of the surfaces of steel are quite beyond the power of the coach maker to entirely prevent, because the composition of the iron and steel he uses are such as inherently promote and generate it.

In carriage building the surfaces of spring plates are freed from grease, and then given a coat of lead color; when this is thoroughly hard, the parts are coated with grease and black lead mixed. Ordinary lead colors, especially red lead, are mostly used in the protection of iron and steel from rusting, but their constituents are such that galvanic action is set up between the lead and iron, and the many experimental processes made by metallurgists could not be carried out in practical carriage building, and their relative effect would probably be to destroy the paint and varnish with which they have to be coated both for protection and embellishment.

In the general overhauling of a carriage when it is sent to be repainted, the proper cleaning of the spring plates should be most carefully attended to. Nothing can be more effective in removing rust than putting the metal through the fire, and thus thoroughly cleaning the plates, says the Automobile and Car Builders' Journal. In the refitting of plates, either to give them a fresh grip of each other, or in the process of recompassing, in which there is a deal of hammering, the rust gets well dislodged, and when thus treated and filed off in addition the plates should be cleaned thoroughly with turps, which assists materially in the cleaning of the plates. The inside surfaces of the plates should then be coated with red lead darkened with lampblack, which soon becomes very hard. Then a very slight coating of grease and black lead mixed should be applied, and the springs put together, but the grease should not on any account be allowed to ooze out from the side of the plates. Grease must be used sparingly, because it destroys the paint and varnish when it works out of the plates, as it becomes rancid through the action of the open air, and is thus changed into fatty acids, which generate rust and destroy the paint.

INDUSTRIAL EDUCATION

This subject is now receiving wide attention. The latest word is by H. E. Miles in what he said or read before the National Association of Manufacturers.

He considered present defects, pointed the way to better methods, and told about what Wisconsin is doing especially.

The common school education is defective, and the system must be materially altered, he thinks.

"There are at present 2,000,000 children of school age, who are out of school, having quit school in their fourteenth year. It is impossible to force these children back into school, but if they could go back, these industrial high schools cost $100 a year for each scholar, and it would cost $200,000,000 to take care of them for one year. If after that you were going to put them through the industrial high schools, it would cost $300,000,000 more; and those children, 5,000,000 in all, would lose wages running from $2.50 a week for the fourteen year old to $7 a week for the seventeen year old, and some of them more. They would lose wages amounting to from three-quarters of a billion to a full billion dollars a year; so that the loss to the children of the United States and their parents, those who are now out of school, and whom some of our teachers would try to force back into school, would be, in wages and expense of instruction, from a billion to a billion and a quarter dollars a year.

"We began to talk about trade schools in the year 1880. We talked and fought and struggled for thirty years, and in 1910 we had thirteen trade schools in a population of 80,000,000, and about 1,500 pupils in those thirteen schools, and we were teaching at most four trades. We were not reaching the mil-

lions and millions of children who became our mechanics. Wisconsin took her lesson from foreign countries, and she decided that she would look after the windfalls of this tree of education.

"Instead of the trade school in Milwaukee half full and costing $300 per child, and instead of trades schools like those in Connecticut, costing $200 per child with only 250 pupils in them and 40,000 children out of them, we are combining the factories of our state of Wisconsin with the schools, for half a day a week, and beginning only last September with about 2,500, half of them from fourteen to sixteen, the rest older—because we let the white whiskered man who does not know his trade come back and perfect himself in our continuation school—starting with 2,500 last September, more than in all the trade schools in the United States to begin with, where do you think we were when November came? Why, we had jumped to 10,000, or six times as many as in all the trade schools in the United States. Where do you think we were by February? We had 16,000. I do not know a laboring man in the state of Wisconsin who is not in favor of the free, impartial and thorough education of every child in our state.

"You can go back to any town in the United States that is an industrial center, and if you will go about it you can start a continuation school in six weeks. The responsibility is yours and the privilege is yours. You must get the teachers from your shops. Look out for that. Do you go to a manual training school and get a man who never saw a shop and who knows nothing about it except theory.

"We have been charged with wishing to commercialize the young life of this nation. I tell you business is a profession, and it is time that we let the country know that we know that business is a profession. It is our privilege, it is our duty to insist that the brains that have developed America commercially shall have a great deal to do with the coming generation. The business men of Germany have done this in Germany, and it is an essential and fundamental element of their schools."

THE ASSEMBLED AND THE OTHER CAR

We must recognize the existence of two types of motor car—the "manufactured" car and the "assembled" car. There is now a distinct and third type coming into existence—the "standardized" car.

Let us briefly analyze the difference between the "manufactured" car and the "assembled" car.

To form the several hundred different component parts that go to compose the modern automobile we would require an immense factory. We would have to have foundries, machine shops, smith shops, brass foundries, electrical machine shops, body-making establishments, upholstering shops, in fact the capital required to install such a plant would be enormous. Yet this is the case with the "manufactured" car. The vast majority of its component parts are made from start to finish in one plant, with, perhaps, the exception of the electrical part of the mechanism. Practically all European-made cars are made thus, and it restricts output considerably.

A slight idea of the methods employed in manufacture of the assembled car should prove interesting. The first part in the process is that the company settle on the price of the car which they intend to produce, for it is the case that the price is settled even before the car is built. The wheel base, or over-all length of the car, is then settled and a rough design drafted. The staff of engineers may have agreed that a certain engine would be best, but if that engine does not harmonize with the final cost of the car, another motor is installed. So it is with all the main features in the car. Perhaps a body maker has a thousand bodies on hand which he is willing to sell at a low price. These bodies are bought and made to suit the frames of the car, or vice-versa. So with every part. The car is made to run in the shops; that means that the parts are machined and fitted to suit one another, but it is far from axiomatic that a part taken from one car of the same size will fit another car of a like size with no bother whatever.

But now we are approaching the era of the standardized car. The manufacturer of this class of car declares firstly what his car is to be before ever a selling price is mentioned. It demands, beyond all, quality, because he is building with the paramount idea of service to the user. His engineering department determines on the essentials of the car; its lines, construction, motor, wheel base, size of wheel, etc. The best motor builder suitable is found, and the best firm for making rear and front axles. Every detail of the construction of the car, down to the most minute part, is placed with a firm who specialize in that particular feature. Then, and not until then, are prices on all the parts obtained, and the price of the car fixed, a price that seldom varies during the life of that particular model.

Now, to build the actual car. The engineering department of the manufacturer draws out every detail of the car from the radiator to the rear axle. Every bolt, spindle and nut is sized to be in the proper space and location. Allowances are made for all dimensions, for running and driving fits; in fact, the complete car is built in blue prints. As we have said, each of these designed parts may go to different factories to be made. The rear axle may be made in Cleveland; the body in Detroit; and the engine in St. Louis.

When the parts are finally shipped to the parent factory they are built for each other as truly as if they were built under one roof—and such is the work produced by an organization whose only business in life is to build this particular part better than anyone else could build it who divided his attention with other duties or endeavors.

It's the old story of specialization. We used to pay as much for a good watch as we would now pay for four watches equally good. Why? Standardization! We used to pay as much for a bicycle as we do for a motor cycle now. Why? Standardization! And so it is that over all the world the lowering of the price of all mechanisms is gradually coming, and all due to the standardization of parts making bigger outputs possible. Men contend that specialization kills originality and inventivity in the mechanic. It may; but it tends to lessen the price of the product and to give to the public a quality that otherwise they could never hope for.

COLUMBUS BUGGY CO. PLANS

Creditors of the Columbus Buggy Co. may effect a permanent organization for the continuance and operation of this industry. Plans are being worked out along this line by attorneys for the creditors, involving the settlement of all claims through the issuance of stock in a new company.

Under the management of the creditors' committee and the direct supervision of the business by George W. Lattimer and T. C. Dunlap, representing that committee, the Firestone associations have been eliminated. O. H. Perry, treasurer of the company under its former management and who assisted the receiver, has been relieved, and Charles E. Firestone, secretary of the old company, has also been relieved. This action by the creditors' committee is understood to have been partly responsible for the resignation of E. R. Sharp from that board. He is said not to have been in accord with the policies of the new management and voluntarily tendered his resignation.

The company is at present employing between 150 and 200 men steadily and not only has a good business already booked, but is receiving new business for delivery in the near future. An effort is being made to keep the entire selling organization going. The creditors have received a number of inquiries regarding the business, but the most of these are said to have involved a sacrifice of the property without conisderation to its going organization and operation and the value as an earning producer under proper management. The committee is said to have been slow in working out its permanent organization plans to give full opportunity for these negotiations.

APPARENTLY SUFFICIENT GASEOUS PRODUCTS

It is fair to say the gasoline supply question has become a burning one, but a consideration of the many sources and products from which a combustion gas suitable to use may be derived, lends hope to the view that the supply will be eventually adequate for needs.

A source of gasoline, though the amount is limited, is obtained from natural gas. This gas, found in enormous quantities in the oil regions, contains a small amount of the vapors of naphtha. By a special method of treatment these vapors may be separated by first cooling the gas, then forcing it into intimate contact with some liquid which will absorb them and then recover them from the absorbent liquid by fractional distillation or some other method, depending upon the liquid used. While the amount of gasoline in a given amount of natural gas is small, the aggregate amount recovered is considerable. It adds somewhat to the supply of volatile fluid, but the amount so recovered or possible to recover can have no determining effect upon the fuel situation.

Petroleum is a complex substance made up of a large number of hydrocarbons mixed together, ranging from very light, highly volatile naphthas through the heaviest naphthas, kerosene and lubricating oils to paraffine or asphaltum. They all consist of different chemical compounds of carbon and hydrogen, which differ from each other only in the number of atoms of each element. In other words, kerosene and all the heavier portions contain exactly the same elements as gasoline only held together in a different combination. If this combination could be broken up a vast quantity of liquid fuel of lighter gravity closely akin to gasoline might be set free. This is the problem which oil chemists have attempted to solve and apparently with some degree of success, as indicated by the advent of the new fuel, "motor spirits," which is not gasoline, but is closely related thereto. It is said to be not quite as volatile as gasoline, but much more volatile than kerosene. It gives promise of relieving the fuel situation for gas engines for years to come.

The oil men are not the only ones who have been exerting themselves to solve the engine fuel problem. Whenever a situation becomes serious or promises to become serious, the entire world of scientists and inventors begin work. This is the situation at the present time. It is the most hopeful feature of the situation, for with so many at work and so much involved there will certainly be relief forthcoming if it has not already been found.

In Europe, where the situation was more acute than in this country, the International Association of Recognized Automobile Clubs has offered a prize of one hundred thousand dollars, and a British society an additional ten thousand dollars to anyone who will discover a cheap substitute for gasoline which can be used in existing engines without any substantial modification. The inventor is not even required to turn over his patents to the societies, so the reward should be ample. The new fuel must, however, be equal to gasoline in every respect. The exhaust gases must not attack the cylinder walls, there must be no carbon or other deposits, the explosion must not be too violent and, finally, it must be cheaper than gasoline and so abundant that it will not increase in price. The conditions are difficult and yet some progress has been recorded.

A German chemist has discovered that acetylene in small proportions when added either to alcohol or kerosene increases its explosibility. The acetylene is first absorbed by acetone and the latter is mixed in small quantity with the fuel base. Another German patent proposes the use of carbureted alcohol which is made by a process of distillation from alcohol, kerosene, coal tar and coal tar oil. In Germany, where alcohol is cheaper than gasoline, this fuel might afford some relief, but in America with gasoline at present prices it is impractical.

Then there is benzol which can be recovered as a by-product of coke. It constitutes one and one-half per cent. of the weight of the coal. If all the benzol were recovered from the coke made in coke ovens in the United States it would add fully 150,000,000 gallons annually to the supply of gas engine fuel. Only a small amount is now recovered and little of that is used for fuel purposes. Benzol is sold in England at fifteen cents a gallon and at that price it can compete with gasoline. It is not as volatile as gasoline and does not give as good satisfaction, yet it is said to be used widely in France and Germany. It is one of the substances that ought to be utilized instead of being wasted.

Then there is alcohol, which holds immense possibilities. So far it has not met the expectations of its advocates mainly because it is expensive to manufacture. Nevertheless it sets the limit in price for all other liquid fuels and gives us assurance that no matter what may happen to the petroleum industry we will always have something to fall back upon.

After reviewing the gas engine fuel situation in all its aspects we feel assured that there need be no fear for the future of the gas engine. In all probability we know the worst and any further change in price will be downwards.

SIMPLE NEW RADIATOR

This is a plate radiator because the components are plates of brass so formed in the process of manufacture that they form their own connections; two plates constitute an element and three elements make up an ordinary radiator, the compound plates being placed one behind the other. Each plate, to begin with, is a plain blank of brass of the outline of the active part of the radiator. By means of dies the plate is perforated; but the metal, instead of being cut out of the holes, is drawn into the form of short tubes, so that one side of a formed plate represents a multitude of projecting ferrules all, of course, integral with the plate itself. A second plate is formed in exactly the same way, but the little tubes are of slightly larger diameter, so that when the two plates are brought together, tubes inward, the tubes of one will just slip over the tubes of the other. In this position special machines lock the tubes together, and the result is a front and back tube sheet, between which water circulates, and a multiplicity of tubes, through which air circulates, all consisting of but two pieces of brass.

A pair of formed plates locked together forms a single element or radiator plate. The sides of these compound plates are closed in and the top and bottom headers attached. An ordinary radiator of three elements contains but 27 pieces of metal all told, including sides, top and bottom, water connections and all. The principal components—the plates—are of such simple construction and so securely interlocked that their strength is naturally very great.

The radiating surface is large. There are 896 of the little tubes to each square foot of front area of each plate, and the tubes are ¼ of an inch long and 5/16 of an inch in diameter. Including both sides of the element and the tube surfaces, there is a radiating surface of 370½ square inches for each square foot of each element. A four-plate radiator of standard Fa-Vose construction has a total radiating surface of 4,940 square inches. The manufacturers make the claim that a Fa-Vose radiator has slightly more cooling efficiency than an ordinary radiator of double the weight.

ONE MORE ELASTIC WHEEL

The industrious inventor has again evolved and materialized a new idea in elastic wheels. In this case the wheel contains no element which in itself would be recognized as elastic, but a certain and not inconsiderable degree of elasticity is obtained, anyway, by having very many elements, each almost rigid, and coupling them together in such manner that a pull on one of them is transmitted at once to all of the others. Thus, if each of 100 elements is made to yield under a shock

1/10 of one millimeter the total cushioning effect which may be produced in one spot may approximate 10 millimeters or 2/5 of one inch. In addition, the rim has a slight yield of its own. Imagine forty round steel links secured pairwise by twenty clips to the inner circumference of a loose rim with a tire band, each clip holding two links, and imagine further that the pairs of rings so suspended are joined by twenty other clips which are pivotally secured to a wheel rim considerably smaller than the loose rim with the tire band. The rings supplemented by the two opposite sets of clips, one fixed and the other capable of pivoting in the plane of the wheel, now form a complete chain anchored inwardly to the wheel rim and outwardly to the rim with the tire. At one point of the wheel rim the pivoted clip is replaced by a very substantial fixed one, so that the mere traction resistance shall not make all the pivoted clips lie down. The contacts of each clip with its pair of rings are designed to afford a rolling action and 160 places where wear may be taken up by eccentric adjustment.

NEW MOVES IN ALUMINUM

The Southern Aluminum Co., capital several million dollars, has been organized by an amalgamation of aluminum producers in France, of certain French and Swiss interests, and of certain metal interests in the United States and has acquired a water power site on Yadkin River, near Whitney, N. C. The company has been developing the property and has plans to erect a large plant for manufacturing metallic aluminum. It is reported that its construction will be under the direction of Paul Heroult.

The projected size of the company and the additional fact that the importation of foreign aluminum is being stimulated by a keen demand promise for the consumers in the United States a sufficient supply of the metal.

The Aluminum Co. of America has secured certain riparian rights in North Carolina and Tennessee and is planning development of the water power for use in an aluminum plant to be constructed at such a point as will insure good freight rates and an adequate labor supply. It is reported that the new aluminum plant will be in operation some time during 1913. In addition to its expansion in the south, the company is building an addition to its plant at Massena, N. Y., which will be one of the largest in the world. It is reported that a large supply of electricity will be conducted from the St. Lawrence at Cedar Rapids to Massena. Plant enlargements at New Kensington, Pa., and East St. Louis, Ill., are also reported.

ST. LOUIS I. V. & H. ASSOCIATION

The doings of St. Louis local bodies are becoming interesting to the trade on account of the coming C. B. N. A. convention.

At the latest meeting of the Implement, Vehicle and Hardware Association new by-laws were adopted reducing the number of vice-presidents from five to three and making the offices of secretary and treasurer one instead of two as hertofore. Geo. B. Ogan, who was recently elected secretary, now assumes the treasurership.

C. C. Hull, president of the Carriage Builders' National Association, was a guest at this meeting and delivered a very interesting talk on the approaching convention as well as the prosperity of the buggy business.

The following were represented at the meeting: C. H. Albrecht Co., American Oak Leather Co., J. A. Arndt, E. C. Atkins & Co., Banner Buggy Co., Campbell Iron Co., Cambria Steel Co., Champ Spring Co., R. N. Collins Vehicle Woodwork Co., Cook Carriage Co., John Deere Plow Co., Diamond Rubber Co., P. E., Ehrenz, Emerson-Brantingham Co., Pioneer Pole & Shaft Co., St. Louis Iron Store Co., St. Louis Surfacer and Paint Co., Vehicle Top and Supply Co., Firestone Tire and Rubber Co., Forbes Varnish Co., E. L. Galt, Goodyear Tire and Rubber Co., Gregg Varnish Co., Johnston Harvester Co., J. D. Manley Carriage Co., Missouri Moline Plow Co., Moon Bros. Carriage Co., J. W. Moon Buggy Co., Mound City Buggy Co., Geo. B. Ogan, Oliver Chilled Plow Works, Parlin & Orendorff Plow Co., Regal Buggy Co., Republic Rubber Co., Sligo Iron Store Co., Standard Varnish Co., C. A. Willey Co.

HUDSON FLOPS TO THE SIX IDEA

Mr. Winton, of Cleveland, must have a grin on his face as broad as Lake Erie these days. He sees the leaders (!) one by one getting into line for the all six idea with that imitation which is the sincerest form of flattery, so Mr. Winton must be truly flattered, being a pioneer six, and the one who discarded all but sixes when others were "four" flushing to success.

The "48 engineers" of the Hudson equipment have now found out what only one found out long ago, so the announcement is there will be no more Hudson "fours," but there will be two sixes, a big "six" and a smaller one. Both in appearance and construction they will differ considerably from the present Hudson "six," a slightly sloping hood and rear springs hung under the axles being two of the innovations.

The Hudson people have also been converted to left drive, center control and dash or cowl fuel tanks, all of which will be features of the new models. In addition, they will be characterized by longer wheelbase and built-in windshields, while a radical departure will be made by the elimination of dash lamps. Instead, there will be employed a device which will permit the headlights to be dimmed at will. For lighting and starting, the Delco electric system will continue to be utilized.

STRONG PROTEST

Emphatic opposition to the passage of bills introduced in the legislatures of Massachusetts, New York and Pennsylvania to increase the registration fees on commercial motor vehicles and to restrict their use by limitation of total weight with load and weight per inch in width of tires, is voiced in a letter just issued by the National Association of Automobile Manufacturers, to associations of merchants and manufacturers engaged in trades that require much heavy hauling, and to large users of motor trucks in the states mentioned.

Steps are being taken by the association particularly to forestall favorable action on a new bill introduced in the Massachusetts legislature which imposes an annual license fee of $5 per ton load capacity on motor trucks, and graduated fees by horsepower on pleasure cars. This appears to be a substitute measure for House Bill 255, which made the fee $5 for commercial vehicles of one-ton capacity and less, and $1.25 for every additional 1,000 pounds capacity.

CARRIAGE WORKERS ON STRIKE IN KNOXVILLE

Fifty carriage workers, members of the Automobile, Carriage and Wagon Workers' union of America, local union No. 183, failed to go to their work in the various carraige shops in Knoxville, Tenn., Monday, June 23. The purpose of the carriage workers was to secure more pay, according to National President L. F. Maire, of Detroit, who conducted the strike.

Practically only two shops, Moore & Kirby Carriage Co., and Frank H. Post & Co., were affected. The other shops of the city were, for the most part, unorganized and the strike, therefore, did not extend to them.

The strike lasted just a week. It is said the men have been granted shorter hours and more pay has been assured, all to become effective August 1.

AT LIBERTY

Frank E. Fisher, for the past two years manager of the Studebaker Corporation of Canada, has resigned that office. He has not made known his plans for the future.

REFLECTORS THAT ALTER ILLUMINATION

The parabolic reflector and the aplanatic lens mirror provide approximately the same illumination, though the kind of illumination provided by each is quite different. Thus, with the former the light is projected in straight beams from the lens mirror, which, if viewed from the front or from any point within a comparatively wide angle in front, will appear to "flash" all over. In other words, the desirable feature of a certain amount of light thrown to the sides of the road, in combination with straight-ahead beams to illuminate distant objects, is obtained. The parabolic reflector, on the other hand, is essentially a narrow angle reflector, and though it has great capacity for projecting the light ahead of the car, it diffuses less light to the sides, and therefore is considered by some to be less efficient as an aid to illumination than is the aplanatic lens mirror.

VEHICLE FACTORIES IN VICTORIA

According to figures published in the last Victorian Year Book (1911-12) there are more registered factories in the metropolis than in the country. A factory is defined as "any establishment employing on the average four persons or more, also those employing less than four persons where machinery is worked by other than manual power, whether the business carried on is that of making or repairing for the trade (wholesale or retail) or for export." Working partners are classed as employes.

Figures given for the coach trade include coach, motor building, cycle and saddlery and harness, and are as follows:

	1910.		1911.	
	No. of Factories.	No. of Hands.	No. of Factories.	No. of Hands.
Metropolitan area ..	212	2426	219	2785
Country	198	1818	191	1849
	410	4244	410	4634

These figures show a decrease in number of factories and hands employed in the country, and an increase of both in the metropolitan area.

INCREASES STOCK TO ACQUIRE MORE REAL ESTATE

For the purpose of controlling some 400 feet of Euclid avenue frontage adjoining the Stearns factory in Cleveland, the F. B. Stearns Co. has added $200,000 to its capital stock. The property is owned by several men heavily interested in the Stearns Company and, at the time of its purchase, possession was vested in a realty company organized for that purpose. The increase in the Stearns business has made it advisable for the stockholders themselves to take over the property, and, accordingly, an agreement has been reached whereby the transfer will be effected by an exchange of the realty company's securities for stock in the F. B. Stearns Co. under certain conditions, $47,000 of the new stock being issued for the purpose. The remainder will be retained in the treasury.

HUNGRY FOR VEHICLES

In Henderson county, Kentucky, it is published that there is a bigger demand for vehicles of better grade, too, than usual. The Delker Buggy Co. is sponsor for the statement.

CHANGES IN GERMAN PATENT AND TRADE-MARK LAWS

A new German law, dated March 31, 1913, makes certain alterations in the laws for patents and trade marks. Citizens of the German empire may now claim the benefit of the laws for the protection of utility models and trade marks and the law of unfair competition even though they do not have a residence or establishment in Germany. A feature of the new law is the section dealing with association trade marks. These are distinguishing marks registered by associations of manufacturers or merchants for exclusive use in connection with the goods of members of the association. They are said to be of considerable importance in Austria-Hungary and some other countries. Heretofore there has been no provision for them in the German laws.

HUGHES BUGGY CO. MAKES ASSIGNMENT

A deed was recorded June 11 in the clerk's office of the corporation court at Lynchburg, Va., by the Hughes Buggy Co., assigning to W. H. Jones, trustee, for $10 and other valuable considerations, all of the machinery, tools and appliances owned by the concern to be disposed of to satisfy the demands of their creditors. This decision was adopted at a recent meeting of the board of directors of the company, and the trustee is authorized in the deed to continue the business of the concern for one year, or such additional time as may be deemed best for the payment of the debts, which aggregate $200,167.37. Nearly all of the creditors are located out of the state. It is said that the assets of the company are between $150,000 and $200,000.

A HINT FOR INSIDE BODY WORK

In order to improve the color of certain native woods of Germany for use in the better grades of furniture a special treatment has been tried with success. The freshly cut wood of birch, oak, elm, pine or spruce is buried in earth mixed with lime and other materials and left for three to five months, which is said to impart to the wood a remarkably fine color, so that it can be used without staining or painting. The color changes throughout and is supposed to be due to a change of the tannin. It is also claimed that this tanning process reduces very materially the tendency of wood to "work" (i. e., shrink and swell) so that dense hardwoods may after treatment be used without fear from that source.

BUSY AT BABCOCK PLANT

The H. H. Babcock Co. plant at Watertown, N. Y., received during the month of May orders for over 1,000 carriages, according to a statement made by George H. Babcock, of the company, to a reporter of a local paper. The orders came from all parts of the company.

"The plant is busier today than it has been in five years," said Mr. Babcock. "We are in need of more men and are taking them on when we can get good ones. Business conditions look good for the future."

STUTZ PARTS' DISSOLUTION

The Stutz Auto Parts Co., of Indianapolis, has been dissolved. The dissolution is chiefly a formality, as the company had ceased to be active as a producer of parts after its principals last year took up the manufacture of Stutz cars.

WARREN'S VALUATION PLACED AT $282,000

According to the receiver's inventory of the Warren Motor Car Co., of Detroit, which was disposed of at public auction, the value of the assets as a going concern is $28,169.62. Its liabilities aggregate $375,000.

RESUME OPERATIONS

The Mitchell Wheel Co. have resumed the manufacture of spokes in their local factory at Hohenwald, Tenn. This concern lost its building and equipment in a fire in April.

VEHICLE TRADE IN PENNSYLVANIA

Allentown is quite a progressive city and in the center of the community of Pennsylvania Dutch. With a population of 60,000, its increasing manufacturing interests and the nucleus of a good, prosperous, suburban population, its carriage and wagon business has prospered and is fair today, although automobiles are in general use.

J. W. Gerhard, 717 South Seventh street, has salesrooms here but his factory is at Macungie, Pa. His son, Harry E. Gerhard, is putting most of his time to the quarry business.

Buchanan & Wickert, 12 North Seventh street, have one of the largest depositories in the state, have several good jobs on hand now and handle about 500 jobs a year. Business is about the same from year to year. The sales so far this year are ahead of last year for the same period. Are selling the product of S. E. Baily & Co., Martin Carriage Works, Waterloo (N. Y.) Wagon Co. and the Acme Farm Wagon. They have been in business many years and have a large trade.

M. D. Martin, an old carriage manufacturer, died a short time ago. Mrs. Martin is interested in the business.

S. E. Bailey & Co. moved last fall from Lancaster to York; before that they had an express wagon factory at York, and have moved the automobile factory to Norfolk, Va.

Carriages and wagons have been advanced generally ten per cent. in price, which, however, is not enough to cover the many advances in the cost of lumber, other materials, labor, etc.

George Lenker bought out Miller Bros.' wagon plant at 112 Hamilton street. He will have to move as the building will be torn down.

The Allentown Platform Co., of 210 South Fifth street, make gears only. Business is quiet. Orders are coming in but not as brisk as a year ago. There are so many in the automobile business that it cuts up the wagon line. Are getting ready to make the entire automobile truck at this plant. The Penn Unit Car Co. has been organized to take care of this branch of the business. This car to be made will have a quick detachable unit power plant. The entire front of the car can be pulled out and repaired without demounting or taking it apart. Have some orders on hand now for it and expect to have a good output of these cars. The farmers are the only ones left to supply wagons to and they want cheap ones. The Allentown Platform Co. has invented a black and white moving picture machine, which presents to the view the natural colors and it will be placed on the market.

The Wolfe Estate is conducting the carriage and wagon business at 326 North Seventh street. The four brothers are in charge and expect to go out of business.

Christ, Peters & Co., of South Hall street, say they had a quiet winter, but are busy now and have been of late doing more of repairing automobiles.

L. Wolf's Sons, of 618 Turner street, making wagons, are preparing to go out of business.

The Webb Co., at Third and Walnut streets, have been making several automobile fire trucks. One of the latest patterns was exhibited here and it is an 85 foot aerial truck. It is designed for the Philadelphia Fire Department, and similar trucks have been made for Washington, two for Trenton and one for Butte, Mont. It is considered a very good success. The demonstration drew a large crowd, and it worked perfectly.

J. A. Thompson, of 43 South Ninth street, has taken the agency for the new Stern car, which is one of the newest models in the automobile line. It is equipped with a silent Knight motor, which requires less gasoline per mile than many others.

Wilkes-Barre

This enterprising city of 75,000 population, in the center of the coal regions, is one of the best business districts in Pennsylvania. The carriage and wagon trade here is very good this year and the country districts report a better condition of affairs.

The automobile is popular here and is increasing in numbers. There is a large output of axles and the big works are very busy. Carriage hardware and supplies of wood are selling quite well this year.

The Standard Top Co., of Kingston, is busy and reports conditions as improving.

R. E. Kniffen, of 777 South Main street, is selling the Studebaker wagon.

R. B. Albertson, of 342 South Main street, says business has been slow, but is showing improvement. Is manufacturing principally coach work now.

C. H. Townsend, of 342 South Main street, is having a fair run on carriages, selling the Columbus, Moyer, Brockway and coaches.

L. Le Grand's, 312 South Main street, has gone out of the automobile business himself and rented this building and three shops to the Wilkes-Barre Automobile Co. Has erected a building in the rear to be used as a wagon factory, now ready for use. He had some machinery before and has added some more to make it up to date. Expects to make the wagon building business his main line in the future.

The J. C. Callahan Co., 439 North Pennsylvania avenue, will erect an addition to the wagon plant and the blacksmith shop, put in a joiner, drill press and two motors. J. F. Callahan has taken an interest and will take charge. Expect to increase the output and have a much better equipped plant and to be conducted in a modern manner.

C. D. Hershberger, of 54 North Pennsylvania avenue, has gone out of business and left the city. All the machinery, supplies, etc., have been sold.

P. J. Boyle, who has a wagon shop in Scott street, is putting most of his time to his position as street commissioner.

H. E. Weidner, of 249 South State street, has been in the business 27 years and has noted many changes in that time as to the building of carriages and wagons and the use of automobiles. His shop has been plastered and steam heat and power installed. Does considerable work in repairing and painting of automobiles. Has now one of the most complete shops in the state. He is considering the matter of enlarging the plant by building another story on, so as to increase the facilities and output.

The West End Wagon Shop has moved and is in better quarters at 80 Wood street. Mr. Dietrich, the manager, has a good business.

J. F. Wilson, 119 South Main street, is getting more into other lines of business, such as piano business and real estate.

The Matheson Motor Car plant, at Forty Fort, was sold at receiver's sale.

The mule is being superseded in the coal mines by electric power, but the price of mules has increased from $125 to $240 since 1897. There are now 604 electric motors in use, while in 1903 there were none at all. For short hauls and steep grades, however, the mule has no peer. There are still many mules underground. There are 1,700 mules in use here.

A YEAR'S FORD REQUIREMENTS

For the 1913 output the following are required: 1,000,000 lamps, 800,000 wheels and the same number of tires, 90,000 tons of steel, the hides of 400,000 cattle, the hair or bristles of 6,000,000 hogs, 12,000 wheel spokes, nearly 2,000,000 sq. ft. of glass, 750,000 lbs. of soft soap, 15,000 tons of moulding sand, while 2,000,000 cubic feet of gas are used every day! To deal with the year's output it is estimated that 35,000 railway cars are required.

SCHACHT ASSETS NEAR TO HALF MILLION

According to the inventory of the bankrupt Schacht Motor Car Co., of Cincinnati, its assets total $243,854.75, which includes $19,000 equity in a piece of real estate. The company's liabilities approximate $175,000.

Trade News From Near and Far

BUSINESS CHANGES

Larson & Struble have purchased the Delsing vehicle business in Oelwein, Ia.

W. A. Price has purchased an implement and vehicle business in Laurel, Neb.

Chas. Gumprecht has disposed of his business in Shelton, Neb., to C. S. Bailey.

John Eastman has purchased the stock of vehicles, etc., of C. D. Taber, in Mable, Minn.

R. S. Zabriskie has sold out his stock of vehicles, etc., in Stanley, Ia., to H. E. Garlock.

The Moore Auto Co. has succeeded to the business of J. D. Moore, in Walla Walla, Wash.

C. H. Hagler has purchased the stock of vehicles, etc., of Frank Spangler, in Strang, Neb.

W. G. Ramsey has purchased the vehicle business of A. J. Van Drimmellen, in Knoxville, Ia.

J. A. Furley has purchased the stock of vehicles, etc., of Navrkal & Wolker, in Leigh, Neb.

Eldred & Day have purchased the stock of vehicles, etc., of D. J. Tiefenthal, in Allegan, Mich.

Wm. Sumpton has disposed of his stock of carriages, etc., in Schuyler, Neb., to P. F. Tulley.

J. N. Shannon has purchased the stock of vehicles, etc., of McGregor & Atkeson, in Fredonia, Kas.

J. W. Ashcraft has purchased the stock of buggies, etc., of Cogswell & Anderson, in Protection, Kas.

E. L. Buck has disposed of his stock of vehicles, etc., in Grand Rapids, Minn., to J. D. Grady & Co.

H. P. Hoeneke has succeeded to the implement and vehicle business of Hoeneke & Hass, in Preston, Ia.

J. W. Rice & Son have been succeeded in the vehicle business in Maloy, Ia., by McCracken & Griffey.

The Schmeider Carriage Co. succeeds to the business of the late August Schmeider, at Chillicothe, O.

L. M. Jewell has purchased the stock of vehicles and hardware of John W. Adamson, in Valley Falls, Kas.

L. I. Olson has been succeeded in the vehicle and implement business in Lake Preston, S. D., by G. G. Johns.

John Q. Adamson has disposed of his stock of vehicles in Valley Falls, Kas., to L. M. Jewell, of Potter, Kas.

Vincent Buerger has succeeded to the entire stock of vehicles, etc., of Buerger & Meyers, in Cheboygan, Mich.

W. A. Hawkins & Son, of Shelbina, Mo., have sold out their stock of vehicles to George W. Stroth, of Clarence, Mo.

G. W. Hermel has disposed of his stock of carriage and implements in Ulysses, Neb., to Beatley Bros., of Norfolk, Neb.

Geo. P. Plies has sold his interest in the Monar Carriage Co. at Latrobe, Pa., to his two partners, S. B. Monjar and Henry Katzenmeyer.

The Moultrie (Ga.) Buggy & Wagon Mfg. Co. has been sold by J. G. Davis to J. T. Smith, an experienced buggy and wagon manufacturer from Monticello, Ga. The name of the company has been changed to the Smith Buggy Company.

NEW FIRMS AND INCORPORATIONS

Andrew Olson is putting in a line of vehicles in Osseo, Minn.

Fred Jelenik is opening a new stock of buggies, etc., in Valparaiso, Neb.

Borg Bros. & Lee have opened a new stock of vehicles, etc., in Westby, N. D.

J. E. McKee is opening a stock of vehicles and implements in Anadarko, Okla.

Forer & Bahti have opened up a new stock of vehicles, etc., in Annandale, Minn.

John Sandberg & Son have opened a new stock of vehicles, etc., in Westbury, Minn.

L. Carlton has opened a new stock of vehicles and implements in Chillicothe, Mo.

Darby & Nichol have opened in the carriage and implement business in Boonville, Mo.

Fred Bott & Sons have engaged in the vehicle and implement business in Cobden, Minn.

Iver Johnson is about to engage in the vehicle and implement business in Northfield, Minn.

George Pullam is about to engage in the vehicle and implement business in Wellsville, Kas.

Nystuen & Severson have engaged in the buggy and implement business in Northfield, Minn.

Coddington & Laird have added wagons and carriages to their implement business in Waverly, Ia.

N. L. Weigen, a hardware dealer of McIntire, Ia., is adding vehicles, and will add a line of automobiles.

J. A. Bolton and W. L. Blair have organized the Sharon (Pa.) Carriage Works. The company will be equipped to do all kinds of repairing, carriage building and repairing of automobiles.

The Pretlow Buggy Co. has been organized at Franklin, Va. E. L. Daughteredge, of Washington, D. C., who is thoroughly conversant with the vehicle business, will be superintendent of the plant.

The Townsend Buggy Co., of Winston-Salem, N. C., has been incorporated with a capital stock of $50,000, to manufacture and sell buggies and wagons. The company will also manufacture harness. The incorporators are L. C. Renigar, E. O. Pleasants and Oettinger Buggy Co.

IMPROVEMENTS AND EXTENSIONS

John C. Raum & Sons, of Baltimore, Md., are about to erect a new wagon factory.

The Hanselman Carriage Co., Kalamazoo, Mich., whose plant was recently destroyed by fire, is planning to rebuild at once, at a cost of $100,000.

FIRES

The stock of vehicles of McHugh & Co., in Lisbon, Ia., has been damaged by fire.

Bonds & Woods' wheelwright shop at Tamaqua, Pa., was destroyed by fire June 15.

Edgerly & Sons carriage factory at Lancaster, Pa., suffered $50,000 damage by fire on June 11.

Fire destroyed D. Lagerquest Carriage Co.'s plant at Des Moines, Ia., June 19. Twelve automobiles burned. Loss, $50,000.

Redmond's wagon works and repair shop at Harrisburg, Pa., was damaged between $20,000 and $25,000 on June 12. Insurance about $10,000.

MIDLAND'S RECEIVER

Edward McCullough, of Peoria, has been appointed receiver for the bankrupt Midland Motor Co., of East Moline, Ill.

THE FEDERATION OF TRADE PRESS ASSOCIATIONS IN THE UNITED STATES

Business Promotion Through Trade Press Efficiency

is to be the keynote of the most notable gathering of technical, class and trade journal editors and publishers ever held in America. No live manufacturer, sales manager, advertising man, trade paper editor or publisher can afford to overlook the

Eighth Annual Convention of the Federation of Trade Press Associations in the U. S. at the Hotel Astor, N. Y., Sept. 18, 19, 20, '13

Two sessions will be held daily. There will be editorial, circulation, advertising and publishing symposiums under competent leaders. Many of the leading editors, business managers, buyers and sellers of advertising, and authorities on modern merchandising methods will take part. On Friday afternoon, September 19, there will be a mass meeting with addresses by representative business and professional men, on subjects of timely interest to editors, publishers and advertisers. Distinguished guests and worth-while speakers will be at the annual banquet, which will be made a memorable social occasion. No matter what may be your connection with the trade journal field, if you are interested in the idea of business promotion through trade press efficiency, if you believe in business papers for business men, you will be welcome at all sessions.

Full information may be obtained from

The Committee of Arrangements

WM. H. UKERS, Chairman, 79 Wall Street, New York

The Federation of Trade Press Associations in the United States

President	Secy.-Treas.	Vice-President
H. M. Swetland	Edwin C. Johnston	E. C. Hole
New York	New York	Chicago

RAUCH & LANG TO BUILD ADDITION

The Rauch & Lang Carriage Co., of Cleveland, O., makers of the Rauch & Lang electric motor cars, will build a four story building at West Twenty-sixth street and Chatham avenue. This will be a large addition to an already large plant. The building will be of brick and steel, will have an unusual amount of light and will be in architectural keeping with the buildings of the plant, but it will be designed with an eye to the ornamental. The new Rauch & Lang building will represent an addition of 78,000 square feet to what is stated to be the largest manufactory in the world devoted exclusively to production of electric pleasure cars.

"FIRE AND FLOOD"

The Muncie Wheel Co. has distributed a most interesting little pamphlet of photo engravings showing the ravages of the flood and fire in Ohio, with special reference to Muncie.

It would be well to get it and keep as a document of semi-historic interest. It would become more interesting as the years pass.

EVERY·AUTOIST·A·CUSTOMER·&·EVERY

THAT'S what you want, friend DEALER, and that's good news involved in the handling of

THE RACINE AUTO TIRE

We'll tell you why!

BECAUSE, your customer will not be worried by seeking to avoid the many sharp things that puncture other tires, for they won't puncture THE RACINE as it takes a pressure of over 4,000 pounds to puncture the chrome tanned leather outside jacket.

BECAUSE, your customer will find it unnecessary to carry that extra tire; four good revolving tires (RACINE AUTO TIRES) being all he will need.

THE FAIRFIELD RUBBER COMPANY

Manufacturers of

Carriage Cloth, Imitation Leather, Automobile Cloths, etc.

FAIRFIELD, CONNECTICUT

KEYSTONE BLACK FILLER

MAKES A PERFECT

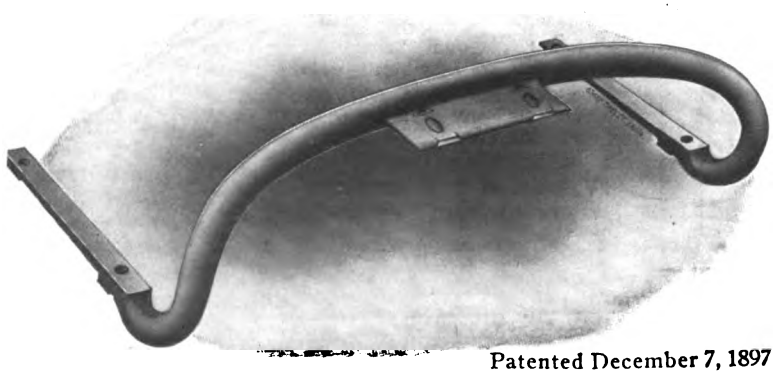
ROUGHSTUFF

For Automobile Bodies and Parts

It fills the pores of Metal and Wood perfectly. Sand-papers easily and produces a fine smooth surface that DOES NOT CRACK, SCALE NOR PEEL.

POMEROY & FISCHER, New York
Selling Agents to Vehicle Trade

KEYSTONE PAINT AND FILLER CO., Muncy, Pa.



Patented December 7, 1897

Bailey Body Hanger

BUGGY and SURREY SIZE

QUICK SHIPMENTS

WRITE FOR PRICES

The Keystone Forging Co.

Northumberland, Pa.

The Hub

Entered in the New York Post Office as Second-class Matter

Vol. LV AUGUST, 1913 No. 5

THE TRADE NEWS PUBLISHING CO. OF N. Y.
Publishers of THE HUB

J. H. WRIGHT, *President.* G. A. TANNER, *Secretary and Treasurer.*
24-26 MURRAY STREET, NEW YORK.

Other Publications of Trade News Publishing Co.:
HARNESS (monthly).....per year, $1.00
AMERICAN HARNESS AND SADDLERY DIRECTORY (annual).....per copy, $4.00

THE HUB is published monthly in the interest of employers and workmen connected with the manufacture of Carriages, Wagons, Sleighs, Automobiles and the Accessory trades, and also in the interest of Dealers.

Subscription price for the United States, Mexico, Cuba, Porto Rico, Guam, the Philippines, and the Hawaiian Islands, $2.00, Canada, $2.50, *payable strictly in advance.* Single copies, 25 cents. Remittances at risk of subscriber, unless by registered letter, or by draft, check, express or post-office order, payable to the order of TRADE NEWS PUBLISHING CO.

For advertising rates, apply to the Publishers. Advertisements must be acceptable in every respect. Copy for new advertisements must be received by the 25th of the preceding month, and requests to alter or discontinue advertisements must be received before the 12th day of the preceding month to insure attention in the following number. All communications must be accompanied by the full name and address of writer.

FOREIGN REPRESENTATIVES:

FRANCE.—L. Dupont, publisher of *Le Guide due Carrossier*, 78 Rue Boissiere, Paris. Subscription price, 15 francs, postpaid.
GERMANY.—Gustave Miesen, Bohn a Rh. Subscription price, 12 marks, postpaid.
ENGLAND.—Thomas Mattison, "Floriana," Hillside Avenue, Bitterne Park, Southampton. Subscription price, 12 shillings, postpaid.

Entered in the New York Post Office as Second-class Matter.

The Good Old Doctor at it Again

The vehicular trade is under never ending obligations to the M.D.

In the pristine days of the horse-drawn vehicle it was the doctor on his rounds, in his vehicle, who thought about the vehicle he was using as well as about the patients he was treating, and as a result of his practical experience in the buggy on the road, in the streets, some of the best improvements that were made came from the doctor. Many grew into valuable and much appreciated and very generally applied patents, others became common practice, due to the quiet talks the good doctor had with the coach builder who was building a new buggy for the doctor.

The trade was laid under obligation to this thinking, observing man.

Now the doctor is applying the same methods to the automobile, and as was to be expected, he finds out things from observation and experiment that make the automobile engineer look somewhat inefficient.

All the high brows in the engineering class have been theorizing and testing ways and means to get away from the carbon deposit in cylinders, but without much success. The final method was to pull the engine down, grind valves, and pay anywhere from $40 to $50 to get the inside of cylinders and the valves in working order.

But along comes Dr. H. F. Ong, out in Oregon, we understand, and with a simple preparation he does the business, does it well, does it at nominal cost, and makes the mechanical engineer's stock of theory and practice look like something of little use or value.

The compound is a chemical, and he did such stunts with it on a Franklin car that the makers presented him with a new car in token of appreciation, and then the doctor had a few kind words to say. It is with pleasure and interest that we quote him:

"Yes, sir, I suppose you may take it for granted that they think highly of my composition, for they have been a long while testing it out to be absolutely sure.

"Of course everybody knows that from the time the first gas engine made its appearance, the one trouble that has puzzled people all along has been the accumulation of carbon deposit in the cylinders. Everybody has tried to find a substance that would eliminate it, not merely engineers and scientists, but every Tom, Dick and Harry who has owned or ever tinkered with an automobile.

"In 1911 the attention of automobile owners was called to the fact that I thought I had a genuine carbon remover in the chemical combination with which I had experimented for months. Among those who tested it were the Franklin automobile people of Syracuse, N. Y. All I did was to make use of my chemical compound when I drove their car out to lunch, and when I came back the carbon deposit had disappeared and the cylinders were as clean and shiney as a well polished piece of silver.

"Their engineer made a personal demonstration. He wired the cylinders on, locked them on, in fact tried every conceivable way of making sure that they could not be tampered with and still all there was to do was to take the car out for five minutes and bring it back and his opinion was, 'there are devices that are said to aid in the removal of carbon, but this is the first time I have seen a compound that does all that is claimed for it.'"

The preparation is so simple, that to use the inventor's own words "a man would fall over at the thought of all there was to do, and the application takes only five minutes. The cost, too, is merely nominal.

"Carbon is not soluble at all as far as is known," continued the doctor. "Not even a white heat will burn it. It is really an asphalt ash and interferes with the economy and efficiency of the engine, causing leaks in the valves and leading to the sticking of the stems. Little

sharp needles of carbon get red hot and ignite the gas, causing the next explosion to occur before the electric explosion is due to take place. That is what causes motors to knock frequently, and I venture to say that one-third of all the motors which are taken to pieces because of this knocking are due to this condition caused by the carbon needles.

"This system of mine in no way harms the mechanism while the carbon does not clog the muffler which in itself is cleaned the same way."

Dr. Ong has made many scienific experiments along mechanical lines and has taken out a number of patents.

The Accessory Maker is the Car Builder

In line with our statement that the manufacturer of accessories is the most important man in the matter of the construction, and is one with whose co-operation almost any vehicle builder may produce motor cars if so disposed, we mention a partial list of concerns that are using for their power plant a very efficient engine built in a western state. Here is the list:

Service Motor Car Co., Bowling Green Motor Car Co., Durant-Dort Carriage Co., Hewitt-Ludlow Auto Co., Tiffin Wagon Co., Brantford Motor Truck Co., Bessemer Motor Truck Co., Available Truck Co., Dart Mfg. Co., Krebs Commercial Car Co., Famous Mfg. Co., Trabold Truck Mfg. Co., The W. H. McIntyre Co., W. Landshaft & Sons, Harvey Motor Truck Co., Hurlburt Motor Truck Co., Chicago Pneumatic Tool Co., Lord Baltimore Motor Car Co., U. S. Government, and others.

The "Monthly" Should Investigate

We find the Carriage Monthly suddenly keen for trade instruction and schools. The impetus seems to have come from the broad minded effects of foreign travel. We read with interest that "all seem to agree, however, that the time has come for an extension of technical education, so as to make it available to every mechanic in the trade, regardless of where he may claim a residence. Out of the various tentative plans brought forward, we feel certain that something definite will be evolved.

"There is no doubt whatever as to the need. The demand for a better trained and more skillful class of mechanics is becoming greater every year, and the necessity for experts, so employers assert, must be answered in some way with a supply of better skilled labor. Such workmen cannot be produced without special training, and the facilities for such training must be placed within their reach, and the workmen must be encouraged to take advantage of their opportunity."

The "Monthly" should supply "all who seem to agree" with the address of the carriage technical trade school, as it does and has always been "available to every mechanic in trade regardless of where he may claim a residence," and what is more to the purpose, it affords him such facilities as can nowhere else be had in this country, especially with the other branches taught in the Mechanics' Institute, and absolutely without price.

We don't see where local schools can match this.

And if the pupil desires to stay at home and work, there is the correspondence school department that Prof. Johnston so ably conducts.

It is the misfortune of new converts to an idea that they never know what is or what has been, so are full of plans that have no force or value.

Firestone Homestead Dinner

Mr. Rubber Tire Firestone is original in more things than making vehicle tires. He dopes out pleasant, generous surprises every now and then. The latest we know about was a dinner to factory foremen at the Firestone homestead.

The inevitable group photograph was snapped showing the guests at table on the lawn in front of the homestead.

What impresses us is the youth of the foremen—the responsible factory men—as they appear in the picture. Not a bald head or a grey head among them; all young, virile hustlers. Of course, we are excluding the guest table where we find capital, the law, beauty and all the grace and courtesy of the occasion.

VISITING THE COUNTRY

Mr. Maurice C. Lloyd, of Melbourne, was in New York in July on his journey to London, from which place he will return to his home. As he landed in Vancouver via Honolulu, etc., he has girdled the globe when he again reaches his home.

Mr. Lloyd is a representative of one of Australia's big tanneries, and due to his connection with the large iron and machinery business known as "'Elize Tinsley," is an all around merchant in industries vehicular.

His business relations with this country are large and varied, the amount and kind of goods bought making a visit to many concerns a necessity.

Though Mr. Lloyd is a young man of 23, he has a maturity of judgment and observation that ought to credit him with many more years. His observations on his own country were not less interesting than those on the others through which he was traveling. We hope he will come back soon again.

FOURTEEN HOURS' WORLD'S SPEED RECORD

This record was created by a 15-18 h.p. Argyle single-sleeve valve-engined car fitted with a worm-driven rear axle, engine bore and stroke 80 mm. by 130 mm., at Brooklands on May 19. The main object of the trial was to establish long distance records up to twelve hours in class D, and as a start was made as early as 6 a. m., would have ended at 6 p. m., but finding by the even running of the car at from 72 to 74 miles per hour, that by running for another two hours a world's record for fourteen hours could be established, it was decided on the spot to continue. The distance covered in twelve hours was 870 miles, 1,697 yards, or 72.58 miles per hour, and in fourteen hours the distance covered was 1,016 miles, or 72.57 miles per hour. The engine made 2,012,000 revolutions during the fourteen hours, and each piston traveled the length of the cylinder 80 times per second, or 34 feet 1½ inches per second. During the fourteen hours 80 charges of gasoline were drawn into the engine cylinders, compressed, exploded, and exhausted every second.

THIS MONTH'S ILLUSTRATIONS

English Design Competition

Having a few months back shown examples of design from the graduating class of the Technical School of the C.B.N.A., we this month present two drawings sent in to the Worshipful Coach Makers' Company competition in England. We are indebted to Cooper's Vehicle Journal for the illustrations.

These drawings, compared with the American designs, will prove interesting, though hardly a comparison, as we have selected a commercial traveler's car from among the awards as being something very interesting in itself. It is a type with which we are not very familiar, but it would seem there might be an inquiry for something of the kind in isolated cases.

The Atterbury Light Delivery Car

The Atterbury Motor Car Co., of Buffalo, is supplying the demand for a light commercial very successfully, and we illustrate a recent car built for O. J. Glen & Sons. The principle of the rear axle member is to supply a solid axle for carrying the load, and a separate one for transmission of power. The power plant is simple, strong and made with the intention of producing durability. All the work as well as the material is of high grade. The company make a point of the study of individual requirements, and much of its success is based on this feature.

The Sandusky

The Sandusky Auto Parts and Motor Co., Sandusky, O. The power plant is of unit construction, and is removable, a most attractive feature. The truck is built as a truck, not as a pleasure car converted to business uses, and the record of long service without material repair cost is something the maker points to with pride. A careful inspection shows good, serviceable design, and the workmanship and material accords with it.

The Curtis Trucks

The Pittsburgh Machine Tool Co., of Pittsburgh, Pa., has a reputation for turning its hand to difficult as well as ordinary work—from caravan touring outfits to everyday bread winners, and we think interest will be found in the lines of the Curtis truck illustrated.

In the caravan idea one car is used by the owner and his guests for the pleasure of riding only and proceeds ahead. In the cars following are carried the baggage and supplies, and sometimes a camping outfit. In one caravan the owner and five guests traveled in a seven-passenger touring car. This was followed by a 40-6 with a truck body carrying supplies, an oil stove, fireless cooker, linen, tableware, folding tables, camp chairs, etc.

Motor Ice Wagon

This two-tone chassis and body is a very well liked model for retail ice delivery in Texas. It is a well-designed and pleasing appearing truck, doing credit to the makers, the Wichita Falls Motor Co., of Texas.

This concern has been busy with making both pleasure and commercial work to supply the needs called for by exacting conditions of operation, and has met and overcome such obstacles very successfully. The style shown is so well liked that it is carried as a stock proposition.

Working Draft of Inside-Drive Landaulet

This graceful body is due to L'Auto Carrosserie, of Paris, and has many points that commend themselves to those looking for beauty of line and design.

A German Phaeton From Paris

The draft of a phaeton copied on lines of German design is taken from La Carrosserie Automobile and will commend itself to all who do not want to follow style tradition without the addition of something new here and there. We show it simply as a stimulus for suggestion and study.

WILLYS-OVERLAND TO BUILD NEW YORK BRANCH

The Willys-Overland Co., of Toledo, O., manufacturers of the Garford motor cars and trucks, have leased a site and will establish a factory in the Mott Haven section of the Bronx, (N. Y.) The building will cover the entire block front on the south side of 150th street, from River avenue to Gerard avenue, being 200 x 148 irregular. It will be a two-story fireproof garage, which the Willys Co. will use as a branch factory and service station, and is to be erected from plans by Frederick Putnam Platt. The lease is for 21 years, and the company will pay an aggregate net rental of about $275,000.

WORM DRIVE ADOPTED

Having demonstrated to its own satisfaction during several years of continual testing that worm gear drive for electric vehicles has certain advantages not possessed by any other method of final drive, the Rauch & Lang Carriage Co., of Cleveland, O., has formally adopted worm drive for two of its models which just have been placed on the market; eventually, it is understood, all models will be equipped with worm drive, though for the present the reduction by silent chain and bevel gears will be retained.

RELIANCE MOTOR TRUCK WILL MOVE TO PONTIAC

The Reliance motor truck plant, of Owosso, Mich., a part of the General Motors Co., will be moved to Pontiac at once. The announcement has been expected for some time as the policy of the General Motors has been lately to concentrate its plants. About 100 men were employed in the Owosso plant. Owosso business men have been given positive assurance, however, that the factory vacated by the Reliance would be occupied by an auto parts company in the near future.

ST. LOUIS, 1914

The Missouri Retail Hardware Association and the Mississippi Valley Retail Implement and Vehicle Dealers' Association have decided to hold their annual conventions and have their exhibit jointly January 21 to 24, 1914, in the large Coliseum at St. Louis. The meetings of the various committees, the convention sessions and the exhibits will all be held under one roof.

WANT VICTOR TRUCK DECLARED BANKRUPT

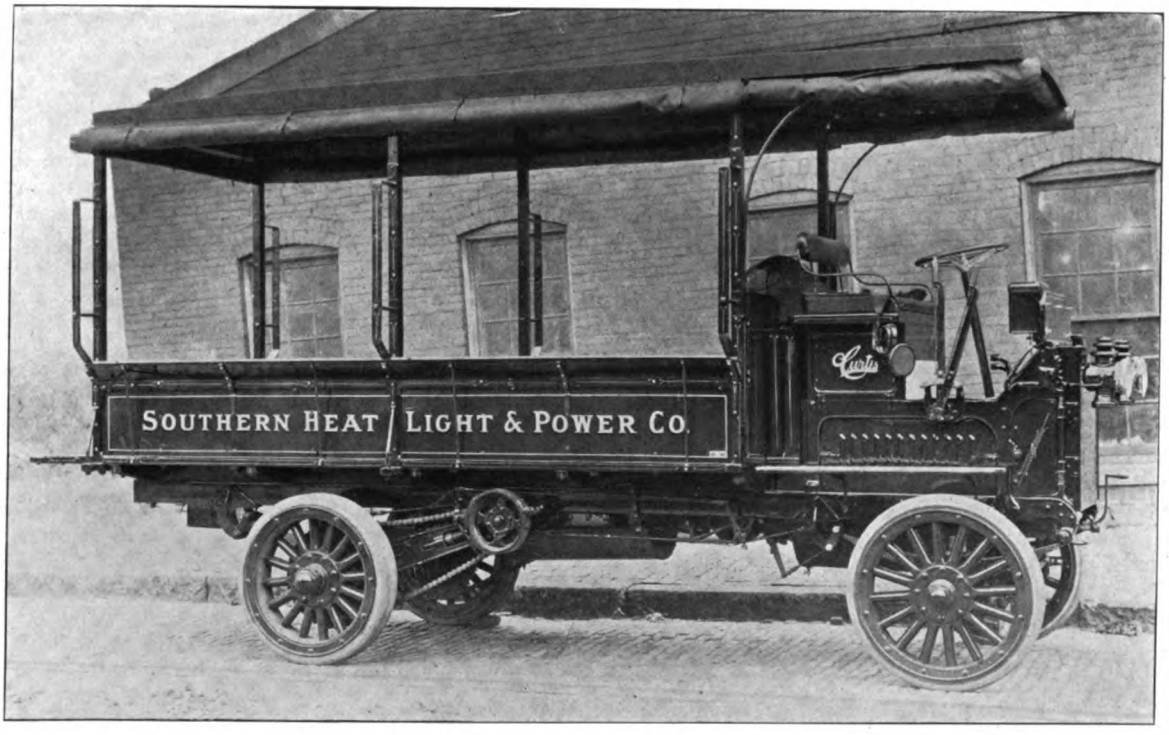
The Victor Motor Truck Co., of Buffalo, N. Y., has been petitioned into bankruptcy by three creditors whose claims aggregate less than $1,600. They allege that an act of bankruptcy was committed in April last when the company made a general assignment of its assets to Marc W. Comstock.

OUTING FOR EMPLOYES

The Sayers & Scovill Co., Cincinnati, O., on July 12 gave an outing to 250 employes and their families at Humboldt Park. There were athletic contests for prizes and a ball game between the factory and office forces, won by the former by a score of 8 to 5. President W. A. Sayers, of the company, was present and was given a rousing vote of thanks.

SOUTHERN BUGGY MAKER GOING INTO CARS

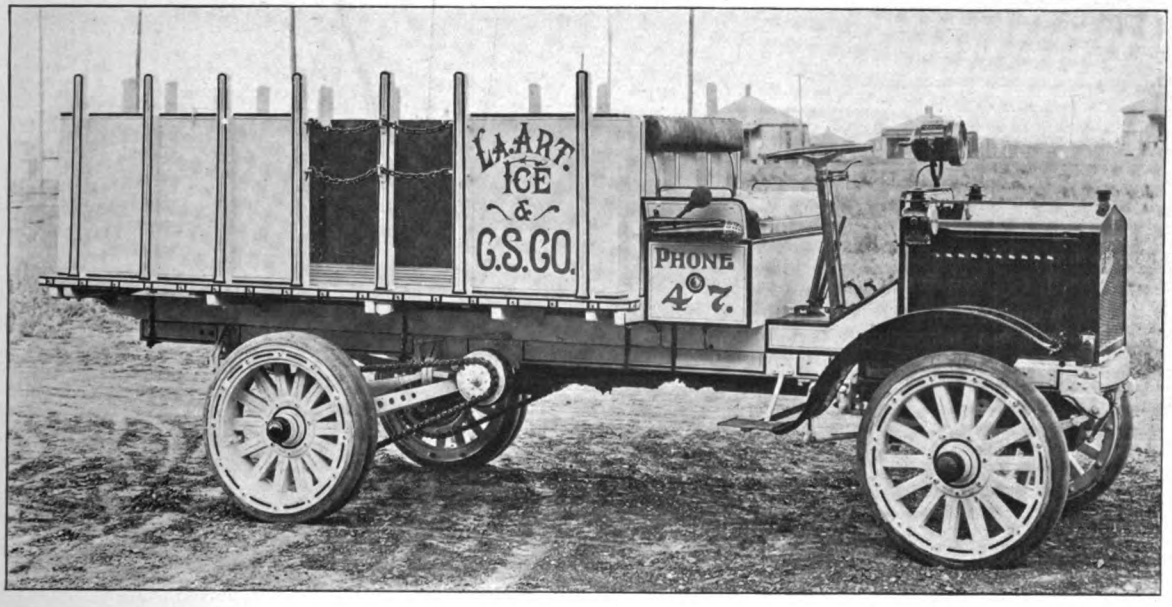
John G. Anderson, who owns the Rock Hill Buggy Co., in Rock Hill, S. C., is preparing to go into the manufacture of automobiles. His first step in that direction has been to engage H. F. Shaw, of Cincinnati, who will assume charge of the automobile branch of the business.



STURDY CURTIS DELIVERY WAGON
Made by
PITTSBURGH MACHINE TOOL CO.,
Pittsburgh, Pa.

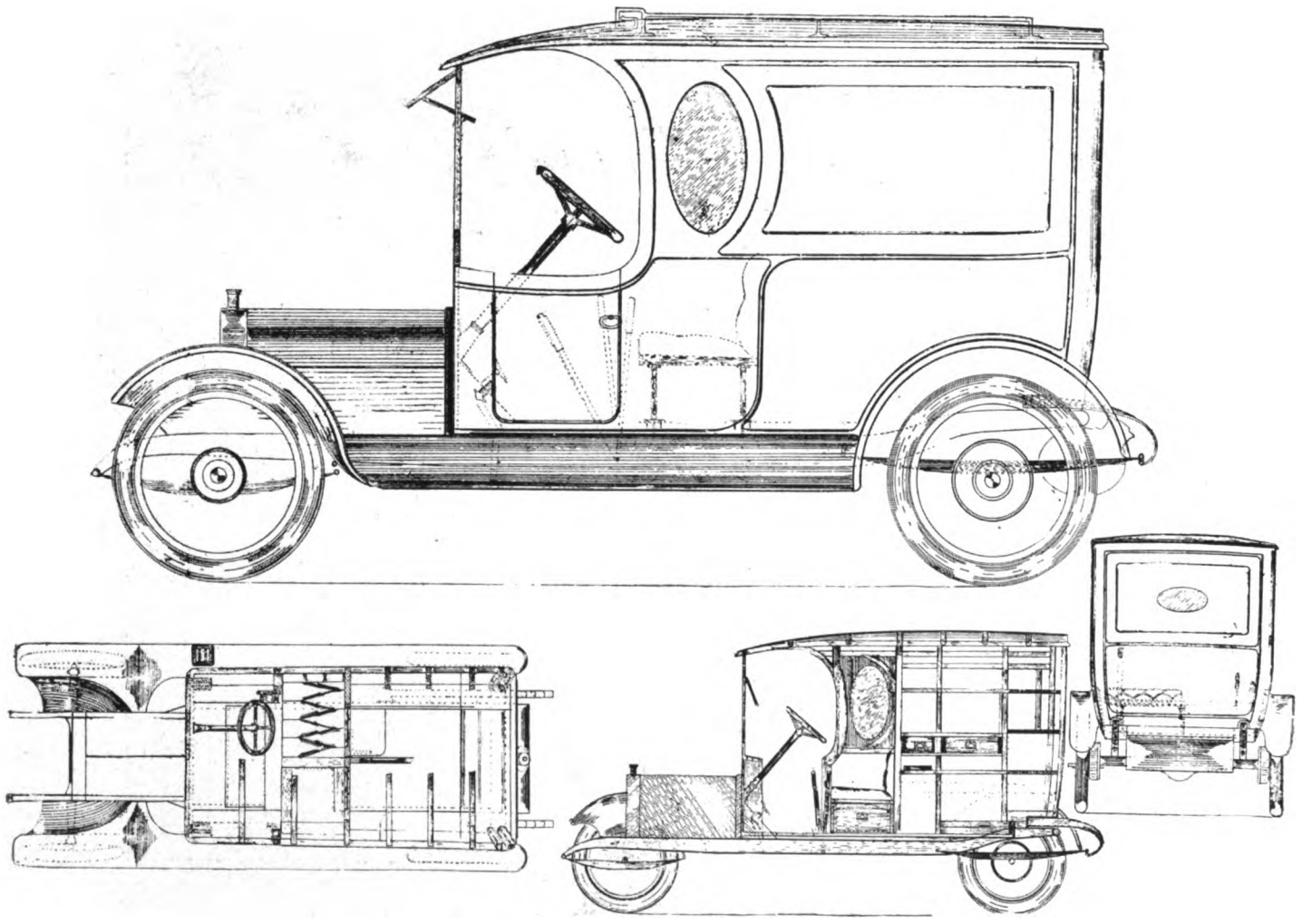
ATTERBURY LIGHT DELIVERY CAR
Made by
ATTERBURY MOTOR CAR CO.,
Buffalo, N. Y.

TWO SANDUSKY COMMERCIALS THAT ARE STURDY
Made by
SANDUSKY AUTO PARTS & MOTOR CO.,
Sandusky, Ohio



STAKE AND PANEL BODY ICE WAGON
Made by
WICHITA FALLS MOTOR CO.,
Wichita Falls, Texas

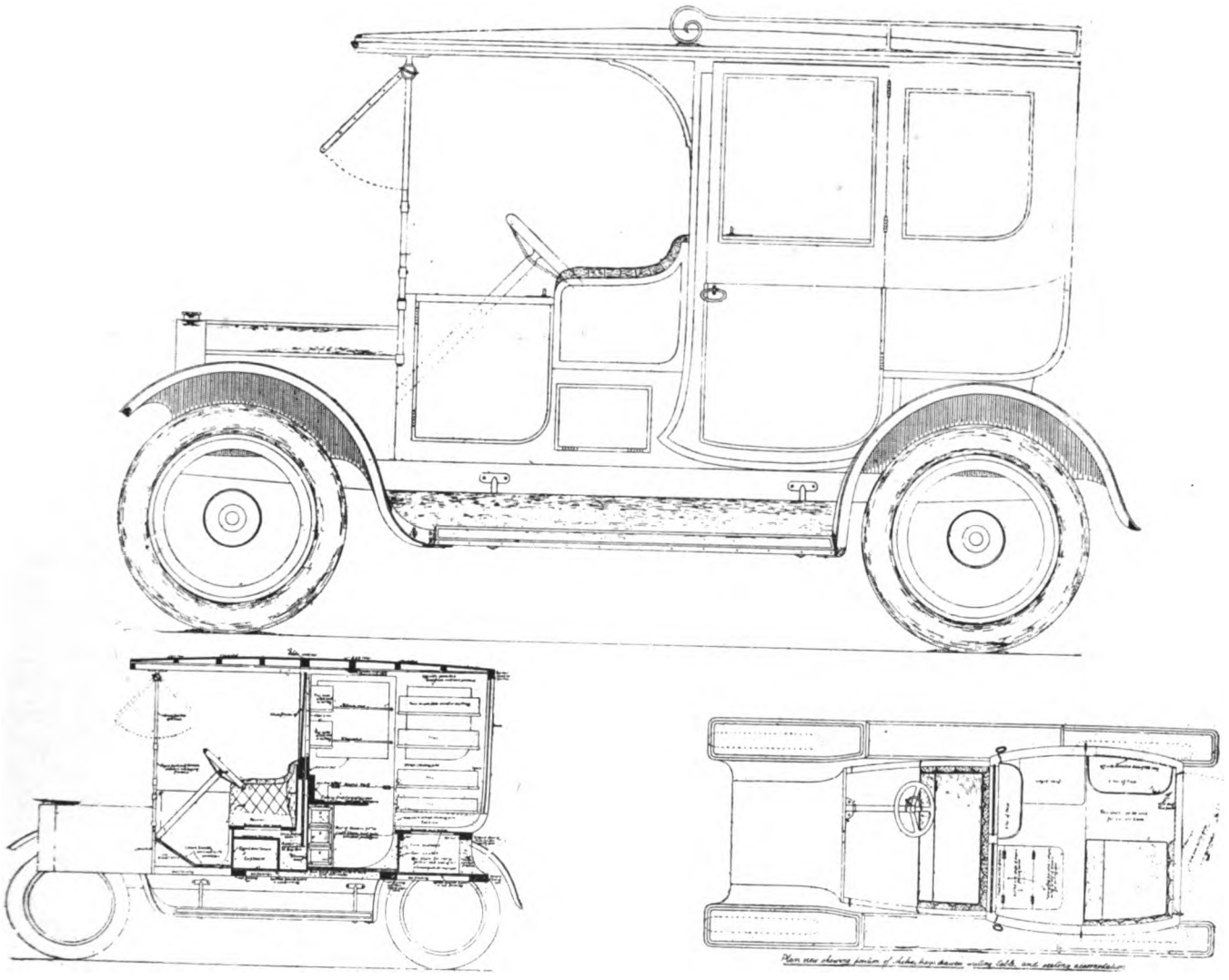
The Coachmakers' Company



COMMERCIAL TRAVELERS' CAR

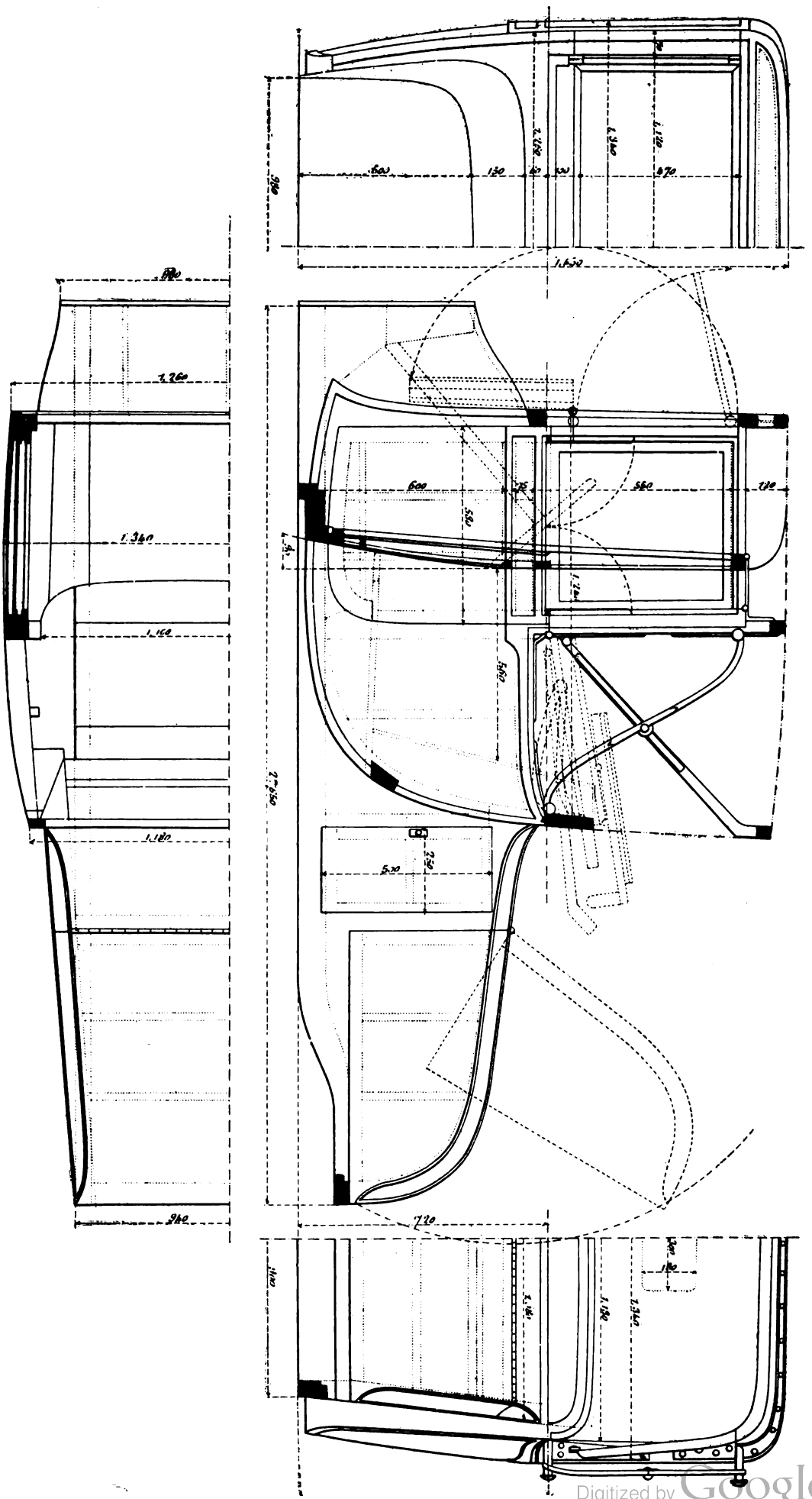
Designed by D. McGREGOR

Prize Competition



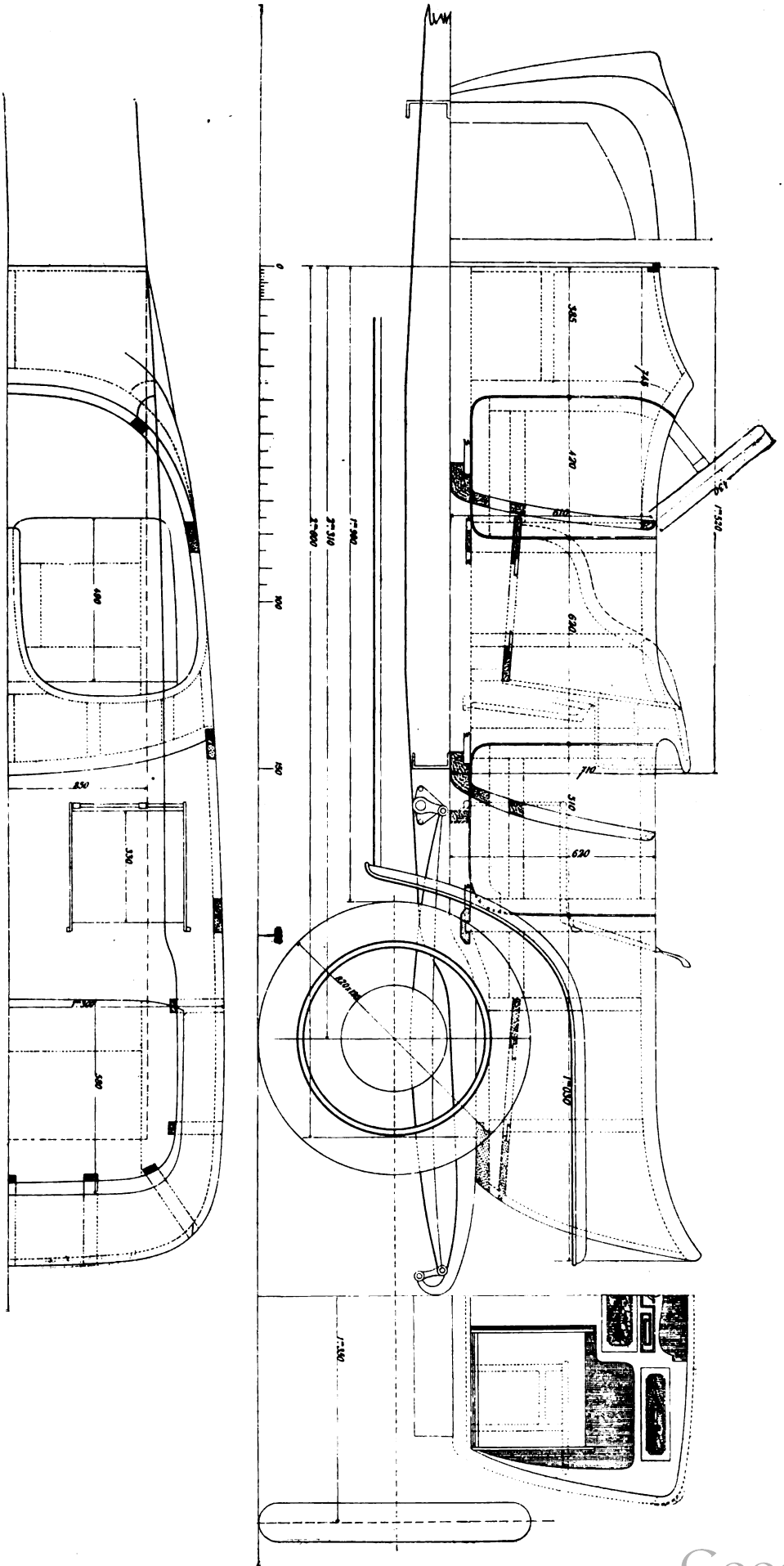
COMMERCIAL TRAVELERS' CAR

Designed by F. CLARKE



WORKING DRAWING OF INSIDE-DRIVE LANDAULET

The drawing is credited to L'Auto-Carrosserie



A GERMAN PHAETON BODY WORKING DRAWING

The drawing is from La Carrosserie Automobile

THE RENAISSANCE OF THE HORSE-DRAWN

Our French contemporary La Carrosserie Automobile says it may displease the ferocious partisans of the automobile to call attention to the movement tending to reestablish the vehicle of other days in all its luxury and elegance. It adds, the streets have been gainers by this new note of beauty and everyone applauds the development.

It continues that the victory of the auto over the horse-drawn was too rapid to be absolute, and it paints the manner of the fading away of the horse vehicle in poetic strain; how the aristocrat clinging to tradition was reluctant to give up his showy four-in-hand that was the vehicular feature of the races, and finally take to the newer fashion, but that among the really noble lords were a select few who still also maintained the horse establishment through all the vicissitudes, but in more moderate scope. The horse vehicle was kept for the show occasions like a ride through the Bois, while the auto was used for speed and long distance jaunts.

Parisians now are taking note of the growing number of horse vehicles in show places like the Alley of Accacias, that had been given over to autos, and now, presto! comes the edict of the Municipal Council prohibiting the use of the Alley to automobiles from 11 in the forenoon to 3 in the afternoon.

The action of the council has rabidly stirred the auto car partisans, but the journal quoted, more liberal and far-sighted, sees the rebirth of the art of the artificer in iron and wood, almost lost since the vogue of the auto, once more having scope to express itself in the most pleasing forms. It thinks the council acted with as much taste as reason.

Then it lets down the auto cranks easily by explaining that their field will always be important and assuages their wrath by saying that, after all, it is only from 11 to 3. But it dwells on the fact that for luxury and display it is silly for the auto to try and compete with the horsed vehicle.

HOW TO REPAIR AND MAINTAIN THE ROADS

The making of good roads is one of the most important duties of the American people and their prompt repair and careful maintenance is essential. There is probably no subject in which the progressive farmer is more deeply interested than that of having roads connecting him with his markets over which he may be able to haul the greatest possible load. Good roads, like all other good things, are too expensive to build and of too much value to be neglected.

The Office of Public Roads of the Department of Agriculture has published a bulletin on "Repair and Maintenance of Highways." This bulletin does not treat the subject of road building, but takes up the repair and care of roads after they are built. All classes of roads, from the natural earth road to the macadam roads with bituminous surfacing, have received attention. The action of automobiles on road surfaces is explained. The systems of road management in Massachusetts, New York, England, and France are given, with tables of costs.

The writer concludes that on account of the use of heavier vehicles and motor trucks the tendency of road building is toward a heavier and more substantial foundation and a consequent reduction of the cost of maintenance.

DR. LOW'S GASOLINE MOTORS A LA DIESEL

All developments tending toward the adaptation of the Diesel motor principle to small high-speed motors which may be employed for automobile purposes are now being sedulously watched by automobile research engineers in Europe, under the influence of the unrest in the fuel situation and perhaps also by reason of a growing conviction to the effect that—with the information and mechanical resources of the present day and with the example of non-poppet valve motors at hand—the time has come for varying the standard design of automobile motors in accordance with these theoretical possibilities which have always been widely recognized as existing.

The features in the Diesel motor which fascinate are (1) the gradual combustion of the fuel, giving a sustained piston pressure, reduced vibration and improved thermal, as well as mechanical efficiency, (2) the injection of the fuel at the end instead of the beginning of the compression stroke, making high compression admissable, as there can be no premature ignition, and (3) the option of several cheap fuels which the system renders available in the Diesel motors of relatively low speed and which, it is hoped, may be used also to some extent in the small high-speed motors which are the subject of the development.

NEW PLANT TO BUILD MOTOR CARS

It was unofficially announced that the new mill being erected by the Standard Steel Car Co., adjacent to its big plant at Butler, Pa., is for the manufacture of automobiles. The new factory is to cost $2,000,000, according to reports. The new plant will occupy several acres and the foundations are already being constructed.

BIG WAGON CONTRACT

F. H. Glen, of the Glen Wagon Works, which will soon locate in Cortland, N. Y., occupying the plant of the Cortland Wagon Co., has closed a contract with the J. I. Case Co., of Racine, Wis., calling for more than $100,000 worth of the wagons manufactured by the new company annually.

DUPLEX POWER CAR CO. NOW READY FOR START

The Duplex Power Car Co., of Charlotte, Mich., has finally settled all outstanding litigation and the company is now expected to go ahead with a rush. The litigation was all inherited by the present board of directors. The company is working on a model for 1914.

STUDEBAKER RETIRES 4,450 PREFERRED

The Studebaker Corporation has notified the Chicago Stock Exchange of the retirement of 4,450 shares of preferred capital stock. This procedure complies with provisions of organization, leaving outstanding $12,650,000.

CHANGE OF FAITH

Durant-Dort Co. has always been steadfast for the horse-drawn vehicle, especially Mr. Dort, but now a change of faith seems to be taking place, and the report has it they may go into power vehicles.

U. S. TIRE ADOPTS NEW ADVERTISING PLAN

Quite unexpectedly, the United States Tire Co. abolished its advertising department as heretofore constituted, George C. Hubbs, the advertising manager, and his entire staff retiring from the service.

FAMILIAR NAMES IN NEW COMPANY

The Columbus Electric Vehicle Co. has been incorporated at Columbus, O., with a capital stock of $50,000, by O. H. Perry, D. N. Perry, W. O. Neff, C. E. Firestone, T. B. Sellers.

FORD BUYS TWO MORE ASSEMBLING SITES

Carrying out its policy of establishing assembling plants in the more populous centers, the Ford Motor Co. has purchased sites in Philadelphia, Pa., and Dallas, Tex.

Wood-working Shop

METAL VS. WOOD CONSTRUCTION

The following extracts are taken from papers which were presented before the American Society of Mechanical Engineers, dealing with various aspects of steel passenger car construction. The papers in question are: " General Discussion of Steel Passenger Car Construction," by H. H. Vaughan; "Problems of Steel Passenger Car Design," by W. F. Kiesel; and "Steel Interior Finish for Steel Passenger Cars," by Felix Koch. The problems confronting the railway carriage and street car builder are closely allied to the problems surrounding motor body building, especially the construction of public service vehicle bodies.

The construction of the wooden car developed along fairly uniform lines. The varieties of framing were few and the differences unimportant. The change from wood to steel has resulted in the abandonment of designs that had almost become standardized and the introduction of many new types, but in this case the principal problem, other than that of obtaining satisfactory designs, has been the extent to which it was advisable to use wood and steel or all-steel construction.

The questions which now confront us relate rather to the design and construction of cars of the present type and of the materials that may be advantageously employed in place of the wood which has been used for so long. They are complicated by the necessity of providing for greater safety for the passengers than was secured in the wooden car, with an equal degree of comfort. Certain difficulties, such as the best systems for heating, lighting, and ventilation, are common to both wood and steel construction, and improvements in these matters pertain to general progress rather than the use of steel construction.

The preferable material for inside finish is a matter for future decision. With the ample protection afforded by steel against accident, there does not appear to be any objection to wood inside finish on the ground of saftey. It is more ornamental than steel and a better insulator, but probably on no question is opinion so divided. There is today very little difference in cost, and it certainly appears probable that in the future the tendency will be to adopt steel interior finish, if not entirely, at any rate to a great extent.

The floor construction in steel cars is entirely different from that in wooden cars, and is usually of metal covered with a flexible cement. In constructing a sample car the writer used, in addition, an underfloor covered with insulating material, and covered the cement with one-half inch of cork. This car was also exceptionally well insulated at the sides, two inches of cork being used next the outside plating. Tests during the past winter have shown that this car is actually warmer than the ordinary wooden car. The floor was tested by taking the temperature of water standing in cans on the floor, there being no practical difference between the results in wood and steel cars. The question of insulation is an important one, both in hot and cold weather, and while other insulation might no doubt be equally effective, it is interesting to be able to advise that with proper insulation there is no question of the steel car being satisfactory.

Differences of opinion still exist as to whether the cars shall be all steel or steel frame with wood lining. Both types of car have been built, and each has strong advocates.

In the all-steel car the steel lining can be securely riveted to the framing, and adds somewhat to the strength of the complete structure, but as steel is a good conductor it carries away the heat of a body coming in contact with it, and therefore will always feel cold, even when the temperature in the car is sufficiently high. Satisfactory results have been realized from the use of a double steel lining between seats, forming a hot-air duct, extending from the heater pipes to the window sill, with outlet through small holes in the lining proper, located immediately below the window sill in the lining proper.

Wood lining requires considerable wood battening for the purpose of separating the inner and outer panelling, and adds weight without adding to the strength. As the steel frame of a long tramcar may vary as much as one-half inch between extremes of temperature, it is necessary to make allowance in the construction of the wood lining for this variation in length. As metal lining riveted to the framing has the advantage in strength, weight, and cost, it will gain in favor; in fact, it would be at present universally preferred if all shops had practical experience with steel lining, and the necessary proficiency and machinery for its manufacture. Three general principles have been used for car insulation:

(a) Wood lining. (b) By placing insulating material on the outside of steel lining. (c) By placing insulating material on the outside of the steel lining, and on the inside of the steel sheathing.

Experiments have been made also with other methods, such as completely filling the space between sheathing and lining with block magnesia and magnesia cement. The problem that presents itself is: Given a body with a comparatively smooth exterior surface protected by several coats of paint, double walls, painted on both sides if of steel, isolated air spaces, rather large in volume, between the walls, an inside cubic volume in which the air must be continually renewed, and a window surface of about one-third of the area of the side walls. When single windows are used the air close to the windows is cold in winter and warm in summer. Double windows improve the situation materially.

Experiments made to determine the difference between a wooden and a steel body, with doors and windows closed, standing on a siding exposed to the sun in hot, summer weather, showed a difference of one or two degrees in favor of the wooden body. One day's readings showed an average of one degree difference in temperature in favor of the steel body, which had insulation only on the outside of the lining. The results of several years' experience indicate that the lining must be insulated throughout, and, if the spaces between lining and sheathing are properly isolated, little is gained by insulating the sheathing, and more will be gained by the use of double windows. Furthermore, the heat lost in cold weather by conduction through and radiation from the walls, in cars with insulation on the lining alone, is negligible when compared with the heat carried off by adequate ventilation.

Everyone who has followed the progress in steel car construction during the last ten years has noticed that very little, if any, steel was used in the interior finish until within the last four or five years.

The earlier specifications and designs for steel passenger cars made the use of machine screws for applying the interior finish prohibitive and impossible, which, of course, made it necessary to employ other means, such as bolts or wood screws. Bolts for this purpose must have heads of special design to allow their insertion through slotted holes, etc., and to prevent them from falling through during the application of the nuts. The nuts, being exposed, are objectionable, as they give an unsightly appearance, even if special cap nuts are used in place of the ordinary nuts; besides there are many places on a car at which it is impracticable to apply bolts.

Therefore, to avoid machine screws and bolts the space between the outside sheets and the interior finish were filled with wood battening to allow for the use of wood screws. The objections to machine screws, caused by the belief that they would work loose in a short time, has, however, disappeared from experience gained through actual service, as it has been shown that if set in white lead and properly applied they are entirely reliable.

There has always been, and there still is, a great difference of opinion as to how far it is advisable to substitute metal for wood. The use of a small amount of wood in the interior finish, as, for instance, window moldings, seat arm-rests, windowcapping, and so on, should not be objectionable, as it has certain advantages over steel which are desirable, but wood is used for such details to a considerable extent, and hundreds of cars are now in service in which the small amount of wood used in the interior finish cannot be detected except by an expert, and such cars are to all intents and purposes fireproof cars.

A more uniform color can be maintained on steel finish than on wood which comes in different shades, and it is very difficult and expensive to match perfectly all parts in one car with regard to shade without additional expense of glazing. Furthermore, the average life of paint applied to steel finish will be much greater than to wood finish, for the reason that wood darkens with age. This, of course, influences the paint, which is a disadvantage from the standpoint of illumination. Should it become necessary to repaint a car of wood finish, reworking of the finish by removal of the varnish and scraping is necessary, whereas in the steel finish the scraping is eliminated and the removing of varnish is alone required to be able to repaint the car.

Steel finish is of advantage from a building standpoint in the handling and working up of material to make ready for application. Steel details can be worked up to a large extent before they are applied, which makes it possible to manufacture the interior finish in much less time by the use of more men than is possible to employ when applying a wood finish, as only a limited number of men have room to work at the same time in a car when the greater part of the fitting and cutting, etc., has to be done.

BELT TRANSMISSION

Belts are no longer made from leather only, and the first problem is the choice of a suitable material. Leather is favored for indoor working in a dry atmosphere, and cotton, canvas, or rope for moist or outdoor conditions. The size of the belt and its duty must also be considered. Leather does not lend itself well to making wide belts nor very thick belts. For the larger drives a woven belt is practically necessary. For small machine belting leather answers well. In case of breakage or stretching it is readily repaired or shortened; more so than canvas or other woven material. Failures and stretching, however, indicate that the belting is not working under satisfactory conditions. Probably the belt is much overloaded, and a new belt or new driving arrangement is desirable.

Occasionally it may be possible to use a wider belt, but it is rarely desirable to employ a thick one or to work with double belt. Thick belting and double bands are particularly undesirable on small pulleys owing to the severe bending stresses set up in them as they pass over the pulleys. If at all possible, the best procedure to adopt with a weak belt is to increase the sizes of the driving and driven pulleys, so that the belt speed is increased and the necessary driving force exerted by the belt correspondingly decreased.

When passing round a pulley the outer face of the belt is subject to an increased tension, and it seems desirable, therefore, that the outer face should be the stronger, which is the hair or smooth face of the leather. Then, too, the soft side of the leather gives a better friction grip on the pulley face, and slipping is less likely to occur. It is true that the soft side will wear more rapidly than the other, but this wear does not reduce the strength of the belt in the same proportion.

The best field for steel belts is that of the main drive, where large powers have to be transmitted. As a rule the steel band runs on rubber or cork-faced pulleys, and hence a high co-officient of friction is obtained. Owing to the high tensile strength of steel, very thin bands can be employed, and these can be run at high speeds. Speeds up to 10,000 feet a minute are being employed, but it is preferable to keep below or at about 7,000 feet a minute, because of the high centrifugal stresses in high-speed pulleys. Steel bands reduce the width of the belting and pulleys, and in the case of large powers an appreciable saving is thus effected. The life of a steel belt should be very great, although the life of the cork or rubber facing cannot be very long. Experience with these belts is still meagre.

At first sight it seems desirable to encourage friction between the belt and the pulley. There are, however, modifying influences at work, and the maximum friction is not much better than no friction at all. A driving belt has a tight side and a slack side. The difference between the tensions on these two sides is, of course, the net driving force. The resultant pull on one or other of the belt pulleys is the resultant of these two tensions, and is rather less than their sum in amount.

According to the accepted laws of solid friction, the maximum friction is a constant fraction of the total load, and from this some engineers have questioned the textbook formula that the maximum friction, which is equal to the maximum difference between the belt tensions on the tight and slack sides, increases with the arc of contact. There is, however, no doubt that the friction does increase with the arc of contact, and without resort to mathematics, the explanation is simple.

The friction is proportional to the total load at right angles to the pulley face, and this load is not the same thing as the resultant or net total load on the pulley. Thus, assuming a uniform tension in the belt, it is obvious that the pressure per square inch of pulley face is uniform and independent of the arc of contact. Hence the total load will increase in proportion to the arc. When, as in practice, the tension is not uniform, the ratio of total load to arc of contact alters, but the general nature of the result remains unchanged.

There is another reason why a long arc favors a high driving force. Some air is always drawn in between the belt and pulley face, and acts as a lubricant until more or less completely squeezed out. Obviously the longer the arc of contact the bigger the proportion from which the air has been squeezed. One would expect this air lubrication to be more important at high than low belt speeds, but no actual experimental evidence seems available.

Friction between a belt and a pulley is important in another way. Since the tension in the belt varies, it follows that the belt extends in length in passing from the slack to the tight side. Such expansion involves "creeping" on the part of the belt, and this represents a true frictional loss. The amount of the creep is determined by the weakness of the belt and the net driving tension. Obviously an overloaded belt will have a large creepage loss apart from any bodily slipping of the belt.

Further, the wear on the belt is due to creeping and slipping. If well designed, slipping should be practically non-existent; but creeping can only be reduced to a limited extent. Hence, to minimize wear the pulley rims should be as smooth as possible. The necessary adhesion between the belt and pulley should be the result of the natural qualities of the materials and not due to rough surfaces.

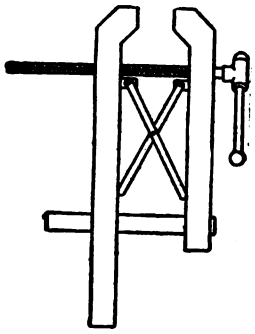
A simple rule is given for single leather or woven belting of usual thickness, from which the power transmitted can be calculated. Allow a net driving tension of 44 pounds for each inch width of belt. If a light double leather belt be employed this load may be increased by 25 per cent., and if a heavy

double belt, by 60 per cent. This rule gives larger belts or lower powers than some other rules followed in practice.

Something also depends on the joints in the belt. A well-cemented joint is considerably stronger than a laced one, and will carry higher loads, but laced joints are more convenient and are in more general use. Belt widths and speeds are generally fixed by the machine makers, and the user has little choice except in the matter of main drives.

PARALLEL VISE JAWS

The gripping portion on the jaws of a vise never holds the work solidly unless their surfaces come together parallel. The ordinary woodworker's vise is usually adjusted at the lower end with a pin inserted in holes or a ratchet bar and pawl, but either is an unhandy arrangement at the best. Here is rigged up a vise like lazy tongs, the two upper ends being fastened near the screw and he lower ends bearing against the inside surfaces of the jaws. The turning of the screw to open the jaws forces the lower parts open at the same time, and in closing them the lower ends are held apart the same distance as that between the jaws. The connecting pieces at the top must be attached to make the space occupied by the parallel device equal to that between the gripping parts.



FEMININE INFLUENCE IN BODY BUILDING

It long has been known that women exert a mysterious influence that has been known to change the destinies of nations. That same influence, coupled with the vagaries of feminine fashions, is likely to alter the shapes of motor car bodies, for in the French courts a judge has ruled that it is the duty of the builder in supplying a car to take into account the fact that long plumes are now being worn on ladies' headgear and to make provision for them. Because one particular builder did not do so the judge decreed that he should return to the purchaser $200 on the price of a car. Count de Kergorlay was the purchaser and he sued for cancellation of the sales contract because the countess's plumes were injured when she rode in the car, which was a closed one.

ACCESSORY SHOW

In all probability, there will be no separate accessory show in New York next January. "It all depends, however, on the car manufacturers' behavior," to quote the language of one of those high in the councils of the Motor and Accessory Manufacturers, Inc.

COACH FACTORIES OF N. S. W.

N. S. W. in 1911, the figures for which are the latest available and have only just been issued in the Statistical Register, contained 246 coach and wagon building establishments, with 268 working proprietors and 49 managers and overseers; they employed 2,600 hands, among whom nearly £11,000 was distributed in salaries, and over £217,000 in wages. A minority of these factories, 64, were situated within the metropolitan district, and they employed 900 hands, the aggregate of salaries and wages being £85,000. The land, building, etc., comprised in the coach factories of the state was valued at £142,000. and the machinery and plant at £56,000. They used materials (exclusive of fuel) worth £239,000, and their products were worth £580,000.

In addition there were eight establishments specializing in making spokes, etc., and employing 144 hands. They represent an investment of over £20,000 in land, buildings, plant, etc.; converted materials valued at £22,000 into finished products worth £46,000, and paid away nearly £13,000 in salaries and wages.

DRYING TIMBER, POWELL PROCESS

This process is English, and much that is good is reported of it. The account is interesting.

The Powell process differs from all present methods of seasoning timber, and by its means newly-felled timber may now be converted, it is claimed, into better seasoned timber within a few days, or weeks at most (according to its thickness), than in as many years by air drying. Large stocks of timber for seasoning purposes are, therefore, no longer necessary, and many trees hitherto practically useless have been converted into valuable timber. The process, it is stated, in no way alters the nature of timber as do kiln drying and the forcing in of foreign substances under pressure. It consists in treating wood in a saccharine solution—in other words "liquid timber," for which wood has a strong affinity. Neither pressure nor vacuum is used at any stage, but the timber is allowed to absorb merely the amount of solution required by each part of the wood to make the whole homogeneous.

When the process is completed, the absorbed saccharine matter is found to be thoroughly assimilated by the tissues and held in molecular combination with the cellular fibres of the wood. It is claimed that every valuable quality is enhanced, while at the same time the wood is sterilized and made stable. The cost of Powellising is lower than that of any other treatment.

GLASS

The smallest carriage builder buys a good many feet of plate glass in a year, and the amount consumed by the trade per annum must be enormous when one considers the number of cars on the road, and that even the cycle car has its adjustable wind screen. However familiar we may be with glass, its brittleness tends to lessen the amount of contempt we may treat it with. It is not always recognized, however, that polished plate glass, or, for that matter, any commoner kind of glass, is easily scratched, and a sheet may be broken while waiting to be used through want of a proper appreciation of the ease with which unequal strains may be set up in a piece of glass.

Glass is often broken by standing it upright on concrete floors. Any sheet of glass, whatever its thickness or size, should always be stood upright, preferably on wooden floor. Never lay it flat, except when actually working on it, and then on a flat, clean wooden bench. A commoner mistreatment of glass consists in scratching the polished surface by means of dirty dusters, and chipping off the surface by means of chisels and other tools when trying to rub off the smears of any cement used in bedding the glass.

It is usual to look upon glass as a substance so hard that only a diamond will touch it, or else the specially hardened steel wheel of a glass cutter, which, it may surprise some to learn, is more often used by the expert cutter than the traditional diamond. Although glass is hard and only diamonds and hardened steel cut it, almost any form of grit or powder, even if the particles are very fine, will leave a series of lines behind to mar the perfect surface which every carriage builder should jealously guard.

The joiner when glazing his frames, and the polisher when going round with his rag, should take every precaution to prevent any injury to the glass. This can be done by using wider strips of brown paper, sheet rubber, or whatever the substance used, so that there is left a working margin inside the frame, which can be cut out after any operations likely to soil the glass have been completed. These remarks open out a fresh field for the critic when closely examining the work of a motor body builder who prides himself on the high

class finish of his work. Is the glass used in the various frames free from scratches? Naturally careless chauffeurs and others can easily defeat all the care which has been lavished on the job, in the same way that the varnished panels are disfigured. As regards cleaning, glass should be treated much in the same way as a varnished panel, except that hot water, dissolving various substances more readily, may be used when a very tough cement has been smeared or spilt on the glass. Obstinate smears must be removed by means of hot or cold water, a clean rag, and gentle persistence. Force must not be used in the shape of knives, chisels, and so on. Such treatment is unworthy of an intelligent workman.

Glass which is drilled, or is provided with a flap, should naturally be treated with every care while it is waiting to be fixed in its frame, and should never be laid flat.

Bent glass should be avoided if possible for vehicle purposes. It distorts the view and is less strong, and can be more easily broken than flat glass.

A carriage builder should never wilfully design a body with lights which require bent glasses.

For those who are interested in the weight of glass we append the following information. Plate glass has a specific gravity of approximately 2.7. Sheet or polished sheet glass, which sometimes interests the builder of cheap taxicab bodies, is a little less dense, having a specific gravity of 2.5, but sheet glass is usually described as so many ounces per square foot.

The following weights of rolled plate glass are per square foot:

1/8 in. thick.....28 oz., or 1 lb. 12 oz.
5/32 in. thick.....34 oz. 10 dr., or 2 lb. 2 oz. 10 dr.
3/16 in. thick.....41 oz. 5 dr., or 2 lb. 9 oz. 5 dr.
7/32 in. thick.....48 oz., or 3 lb.
1/4 in. thick.....54 oz. 10 dr., or 3 lb. 6 oz. 10 dr.
9/32 in. thick.....61 oz. 5 dr., or 3 lb. 13 oz. 5 dr.
5/16 in. thick.....68 oz., or 4 lb. 4 oz.
11/32 in. thick.....74 oz. 10 dr., or 4 lb. 10 oz. 10 dr.
3/8 in. thick.....81 oz. 5 dr., or 5 lb. 1 oz. 5 dr.

This is at the rate of about 6 2/3 oz. for every thirty-second of an inch thick per square foot. It will be useful to remember for approximate calculations that a square foot of 1/32 in. glass weighs 7 oz.

CHANGES IN PERSONNEL

George H. Bryant, advertising manager of the Locomobile Co., has resigned that position to become identified with the Velie Motor Vehicle Co., of Moline, Ill. He will be attached to the advertising department.

C. M. Tichenor has been appointed sales engineer of Gray & Davis for the territory adjacent to Detroit, in which city he will have his headquarters.

J. G. Monihan, advertising manager of the Premier Motor Mfg. Co., of Indianapolis, has resigned that office to become the assistant director of sales and advertising of the Cole Motor Car Co., of both of which departments Homer McKee is the head.

THE COMMERCIAL TRUCK BODY

During the last few years, development in design and construction of private car body work has been so rapid, and the adoption of the utility automobile so gradual, that the former interest has necessarily absorbed attention at the expense of the latter, although, from time to time, many designs for light delivery vans, small omnibuses, char-a-bancs and the like have been included in our colored plates and our working drawings. In private car design, however, we appear to have reached a point at which changes are likely to become less rapid, while there is every sign that the use of mercantile motors of all sorts is likely to increase more and more quickly every day, the very growth of the movement tending to still more expansion. Indeed, the time is ripe for our trade to take into very serious consideration the continuously increasing dimensions to which the adoption of the industrial motor vehicle is attaining (coupled with the certainty that in the future its importance will eclipse that of the private car) and to decide whether the building of bodies for these vehicles is to be looked after and fostered as a recognized branch of the body building trade, or to be allowed to fall into the hands of others.—Cooper's Journal.

BODY BUILDERS BEAT WHITE SECOND TIME

Litigation which followed the sale of a town car body to the White Co., of Cleveland, O., December 29, 1911, by the Manhattan Top & Body Co., of New York City, has terminated in a verdict in favor of the body builders upon the second trial of the action in the New York City Court. The White Co. refused to pay for the body on the grounds that it was defective and set up a counterclaim of $1,430. The body builders claimed $850 for the body, $5.50 for labor and interest.

The first trial—about a year ago—resulted in a verdict of $871.25 for the body builders, but a new trial was secured.

BOUQUET FOR AMERICAN VEHICLES

Vehicle makers in New Zealand held a meeting in May, organized a national association and discussed trade topics and trade evils. From the report of the proceedings in the Australasian Coachbuilder, we extract a few remarks offered by J. W. Brayshaw, who had recently retired from business after many years spent in building vehicles at Korito:

"We have much to learn from the Americans, as if the American vehicles are used for the purpose they are intended to be used for and given fair treatment in this respect, they are eminently satisfactory. I would sooner drive in an American buggy than a colonial built one, as it is more comfortable and better in every way, and although I am going cow spanking, I am going to stick to my American buggy. I consider the New Zealand coach builders have a lot to learn in producing suitable vehicles, both pleasure and business, at a much lower cost to the public than that now obtained."

EXPRESS RATE REDUCTION

It is reported that the Interstate Commerce Commission will shortly announce the fact that it has approved the proposed reductions in express rates, which the express companies have been fighting since last spring. A schedule of rates prepared by the commission provides for reductions of from 25 to 50 per cent. on packages under five pounds, and 10 to 30 per cent. on heavier parcels. The new rates will go into effect as soon as the decision is published. The rates will represent maximum charges between given points, and the express companies will be obliged to make these or lower rates. In many cases, it is said, however, that the rates already have been reduced below the Interstate Commerce Commission's schedule, due to the competition of the parcel post.

THE EAST PASSES BRAZIL

For the first time in the history of rubber, the production of rubber from the Far East for the year ending June 30, 1913, will exceed the output of rubber from Brazil. According to the closest estimates, the Brazilian production for the year will be 42,000 tons, an increase of about 2,000 tons over last year, while the output from the east will be somewhere from 50,000 to 54,000 tons, or 20 per cent. more than the Brazilian product. Incidentally, it might be mentioned that the price of fine Para on June 1 was 90 cents a pound as against $1.10 a pound one year ago.

STANDARD OIL SAYS IT'S A GOOD ONE

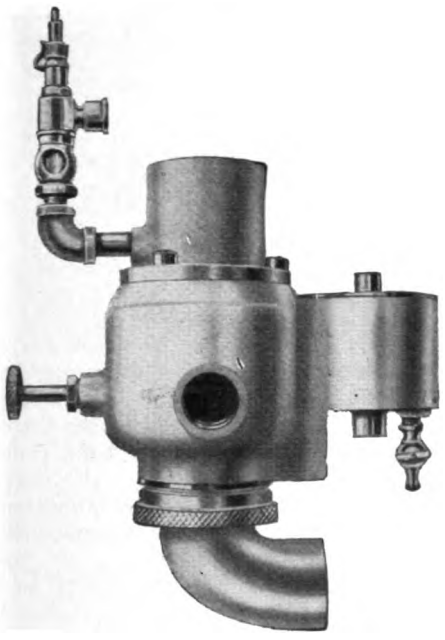
The National Oil Gas Generator Co. is now marketing a device which transforms any style or make of gasoline engine into a kerosene burner.

For the past two years this concern has been quietly installing its kerosene gas generators on various makes of engines. The tests prove that the device does the work and saves from 50 to 66 2/3 per cent. on fuel bills.

The generator is attached direct to the exhaust pipe of engine and exhaust discharged through it, heating an inner or generating chamber.

Oil, with a proper proportion of air and water, is drawn by the suction of the engine into this generating chamber and vaporized.

The oil and water thus vaporized, together with the air now being thoroughly mixed is, by the suction of the engine drawn



into the combustion chamber, properly prepared for complete combustion.

This means that the entire gas mixture is fired, and that there are no carbonaceous or other fouling deposits as a result of imperfect combustion.

The preparation of this gas is automatically regulated by the suction of engine to meet the ever fluctuating load, intermittent or otherwise, therefore every charge is completely fired.

Of all the engines in use not one shows a trace of carbon. An engine equipped with this generator runs equally well from full load to no load.

Among the advantages of kerosene oil as a fuel are:

Kerosene has a greater explosive energy than gasoline or naphtha, consequently the quantity required is much less.

Kerosene can be procured at from one-third to one-half the cost of gasoline.

Kerosene does not deteriorate like gasoline through the loss of volatile elements by evaporation.

It possesses greater specific gravity and can be used to better advantage in any climate or altitude.

The full energy in the oil is obtained.

STILL ANOTHER—THE CHAMBRAY

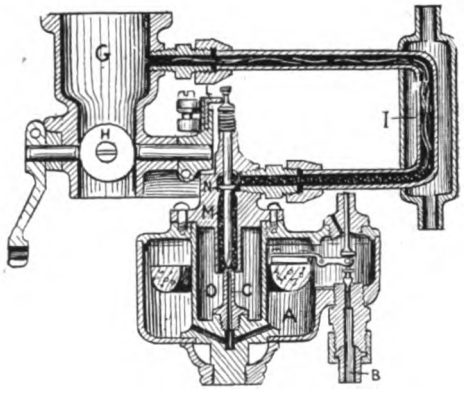
Among the most ingenious of kerosene carburetors, as well as one of the very newest, is the Cahmbray, which is here shown in section. The cardinal principle is the application of heat to atomized kerosene to convert it into true vapor, and means are supplied for applying heat for starting as well as for running.

The working of the carburetor, which is mechanically controlled and is innocent of automatic devices—unless the float-operated needle valve can be so classed—is clearly followed by reference to the illustration. It will be noticed that the usual direct connection between the float and mixing chambers is absent, there being instead a long, tubular passage through which atomized fuel is led to a separate mixing chamber, the tube first passing through the exhaust manifold where the pulverized kerosene is heated and gasified. The gas so formed passes into a separate mixing chamber, which has a bottom opening regulated by the usual type of throttle valve, which acts, also, as the extra air inlet.

The annular float chamber, A, is of the usual type, as is also the needle valve and its operating mechanism; the kerosene inlet is at B. A central air chamber, O, contains the spray nozzle, C, the opening of which is controlled by the needle valve, M. A small quantity of air is admitted to the air chamber and mixes with the atomized kerosene. The long stem of the needle valve, M, passes up and out through a guide and carries a collar upon which bears the cam, L, carried on an extension of the shaft on which is mounted the throttle and air valve, H. Below the collar on the valve stem is a spring which keeps the valve stem raised as far as the collar, pressing on the cam, will permit. Above the collar is a small milled head by means of which the opening of the needle valve with relation to the height of the collar is adjusted. A valve, N, of the poppet type is formed on the valve stem and is held off its seat when the throttle is open.

The gas-producing tube, I, passes through the exhaust manifold and enters the mixing chamber, G, above the throttle, where it is considerably enlarged. The flow of vapor through the gas-producing tube is controlled by the valve, N, which is raised by the cam, L, as the throttle, H, is opened and lowered when the throttle is closed; the needle valve, of course, shares this movement and opens and closes in consonance with the throttle.

When the motor is running the partial vacuum formed in the mixing chamber, G, and the gas-producing tube, I, draws kerosene from the spray nozzle, C, and at the same time air, which enters the chamber, O, through openings not shown, into the space around the needle valve shank and upward, past the little poppet valve and through the tube into the hot zone



Sectional View of Chambray Kerosene Carburetor

within the exhaust manifold, where the atoms of kerosene are converted into a gas which is extremely rich, owing to the small volume of air with which it is mingled. Entering the mixing chamber, G, the rich gas is mixed with a large volume of air from the valve below. It is claimed that the kerosene forms a gas that does not condense and is not dependent upon cylinder heat to compelte its proper formation.

As the throttle, H, is opened, allowing more air to flow to the mixing chamber, the cam, L, permits the needle valve to rise, allowing more kerosene to pass through the needle valve and at the same time raising the poppet valve to permit the spray and air to pass. If too rich a mixture is sent to the motor the milled head on the top of the needle valve is turned down, which gives a smaller opening of the spray nozzle for

a given throttle opening; if the mixture is too lean the opposite course is taken.

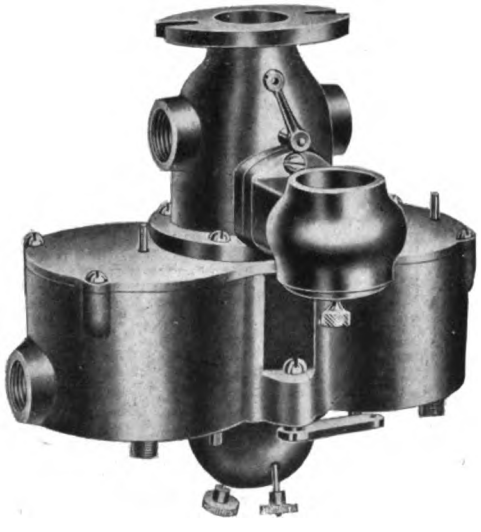
In order to permit starting on heavy hydrocarbons, an electrical heating element is applied to the gas-producing tube to furnish the requisite heat until the exhaust takes up the work. It is only necessary to switch on the current for a short time, the exhaust quickly becoming hot enough to properly vaporize the kerosene passing through the tube. It is claimed that the range of fuels the carburetor will handle includes ether, the various grades of gasoline, distillate and alcohol, as well as kerosene.

ANOTHER KEROSENE CARBURETOR

The constantly increasing demand for gasoline, caused by the rapid increase in the use of the internal combustion motor has started the engineers and manufacturers on a still hunt for some substitute, probably with the double motive of meeting the enormous demand for such a fuel and securing the large premiums and rewards offered by the foreign automobile associations.

This anxiety, however, is unwarranted, as we have the logical fuel at our very doors. Kerosene can be had in any quantity in every civilized country in the world, at a nominal price, and owing to the fact that in the process of distillation it is necessary to make five or six gallons of kerosene to obtain one gallon of gasoline, there is no danger of the two fuels ever being on par with each other in price.

Every gas engineer knows that there is more power to be obtained from kerosene, gallon for gallon, than can be obtained from gasoline, but owing to the many difficulties in handling, such as fouling of cylinders and spark plugs, loss of power, etc., few, if any, have succeeded in commercially adapting this



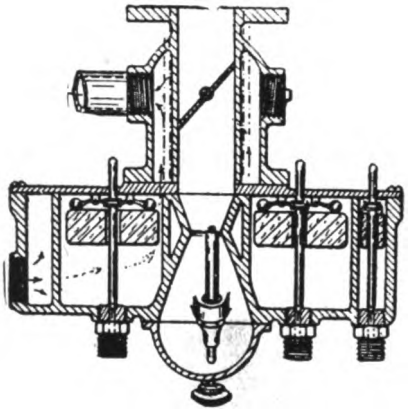
Hampton Carburetor

cheap and plentiful fuel to general use in the internal combustion motor, except where the engine has been especially designed for the purpose.

The engineers of the Hampton kerosene carburetor have been working for the past year along the very lines laid down by every technical writer and gas engineer familiar with the subject, namely, the extremely fine atomization of the fuel, the use of a certain amount of water, atomized and closely intermingled with the kerosene, and the heating of the fuel to a certain point to cause rapid vaporization, also the heating of the metal surrounding the mixing chamber to prevent condensation.

More particularly described, the Hampton kerosene carburetor works upon the following principle, which according to all engineers is the correct one. Instead of trying to gasify the fuel, which would entail the use of a great amount of apparatus and considerable expense, this carburetor atomizes it into the finest possible atoms, and at the same time, by using a predetermined amount of the exhaust heat, through a jacket entirely surrounding the fuel bowl as well as the choke tube and throttle, thus maintaining the metal with which the gases come into contact at a uniform heat, approximately the same temperature as the cylinder walls and preventing condensation.

A small amount of water (varying with the type of engine) is finely atomized at the same time through a spray nozzle tangentially opposed to the kerosene spray nozzle in such a



Hampton Carburetor
(Sectional view)

manner as to cause the oil and water to thoroughly intermingle with a powerful swirling motion, and in this fog like condition, each atom of oil being separated by an atom of water (they will not mix), they are drawn into the cylinders by the suction of the engine.

The primary air is also heated by the connection of a flexible steel hose to a sleeve around the exhaust pipe. The auxiliary air valve has a double adjustment.

Upon this mixture of oil, water, gas and air being compressed and fired by the usual means, the highly volatile parts of the oil having been released first by the extremely fine atomization, begin to burn, resulting in temperatures which may go as high as 3,000 deg. F. This high temperature creates a chemical reaction between the oil and water atoms which makes the atoms of oil very inflammable and prevents the so-called process of "cracking" which is the cause of carbon deposits.

Since these atoms of oil are exceedingly small they offer a great deal of surface for the propagation of the flame: hence the combustion is very rapid, although it is not quite so rapid as the combustion of gasoline vapor. This, however, is no drawback, but a desirable feature. The result obtained is that all the fuel contained in the cylinder is burned cleanly, and, bulk for bulk, the engine will consume no greater quantity of kerosene than it would of gasoline to develop the same horsepower.

The owners of this particular carburetor claim to have successfully operated nearly all the standard types of four-cycle engines, both single and multi-cylinder, horizontal and vertical. Up to the present time the engineers of the company have confined their efforts to the development of the marine and stationary types, both high speed and heavy duty, but claim there is no reason why it should not operate with equal success on the automobile and commercial vehicle.

It is claimed that a 50 h.p. engine running ten hours a day will show a saving in fuel cost of $2,061 per year of 300 working days—smaller engines in proportion. The above figures are based on the present wholesale price of both fuels, namely 19 cents per gallon for gasoline and 8 cents per gallon for kerosene, and on the consumption being one pint per horsepower per hour on each fuel.

Paint Shop

MANIPULATION OF THE PAINT BRUSH

Just as there are many kinds of brushes to suit the varied requirements of the painting trade, so there are many ways of manipulating a brush to satisfy the peculiar properties of the various materials used. It would be just as insane for a painter to apply always the same method as for a doctor to supply always the same physic, regardless of the complaint.

The painter should be able to adjust his method and "touch" to suit the material he is applying, and the want of ability to do so has led to many disastrous results.

There is a greater demand for this skill today than there ever was. With the increased output of ready-to-use materials, of the composition of which the painter knows little or nothing, and seldom troubles to enquire, with the fine-drawn specifications where two coats are expected to do what used to be considered the work of four, it is more than ever important that the painter should do all in his power to equip himself to meet the present conditions.

His first duty should be to learn all he can concerning the special attributes of the materials he is called upon to use, and his second, to see that he is properly equipped to do them full justice.

Paints generally may be divided into two main classes, the "flowing" and the "non-flowing." Each of these classes contain varieties as widely divergent as "gloss" and "flat," "quick-setting," and "slow-setting."

It should be the painter's first care to find out to which class and variety the material he is to use belongs, as this will determine his method of application.

If the paint comes to him ready for use, he should read carefully the directions accompanying it; they are generally sufficient to indicate to which class or variety the paint belongs, though we have seen instances where such was not the case, and the user was left to find out for himself as best he may. The most important point is whether the material is of the "flowing" or of the "non-flowing" type, as the application of these two is entirely opposite in character, and the next is whether it is "quick" setting or "slow." It will be found, as a general rule, that all flowing materials are fairly quick setting. They must set or they would run. It can also be taken for granted that all gloss enamels and varnishes are of the "flowing" type, while the undercoatings and oil paints are of the non-flowing class. This latter, however, has exceptions, for there are now on the market some oil paints and undercoatings which have distinct flowing qualities, and it is very important to know this before commencing to paint. These and what follows are the result of the observations by C. E. Oliver in The Decorator.

Let us take as an extreme example the application of two materials.

(1) An oil paint of the non-flowing class and slow setting variety.

(2) A "flat" enamel, "flowing" and quick setting.

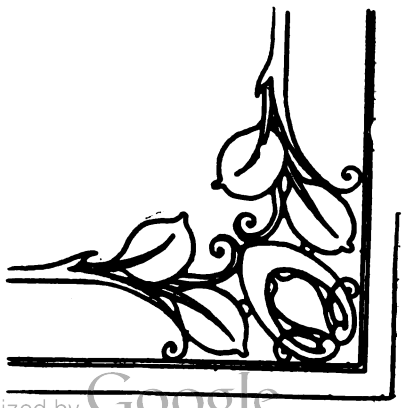
In the former we have a material which allows plenty of time for spreading, but which requires crossing and fining down, and finally must be laid off so lightly that no brush marks are visible. It is here that the painter's skill is most necessary, and it is not too much to say that there are many old hands who have never acquired the art, and plenty of young ones who will never get the opportunity of doing so.

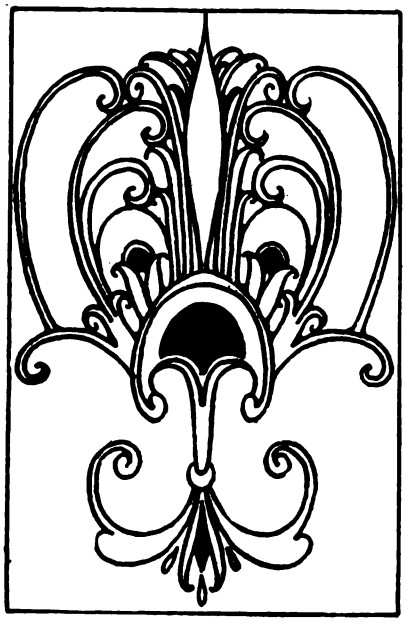
The first requisite for the application of this class of paint is a fine, flexible brush. Much good work has been done in the past, with the well-broken-in pound brush, but the changed conditions to which we have alluded, coupled with the difficulty of bringing them to the right condition at the right moment, has led to the adoption of a secondary brush for laying-off, generally of the full flat black bristle variety, while the pound brush is only used for the actual spreading of the paint. There is much to be said in favor of this method. It doesn't much matter whether the pound brush is new or old, the fine black brush will remove the brush marks. Another and most important point is the fact that you cannot lay-off paint finely with a brush which is charged with color. The final touch must be done with a practically dry brush and for this reason much time used to be spent in rubbing-out the brush, generally on the wall, if available, in order to bring the brush to a fit condition for laying-off.

There was no need of a secondary brush when the number of coats allowed was sufficiently ample to allow of each one being spread out to its utmost limit. By the time a panel was covered the brush was nearly dry and fit for laying-off. No such brushing out is possible now, and the successful painter is one who can apply a good round coat and still get it fine and free from brush marks, and the use of a secondary brush, with its fine black bristles kept almost dry, will help him to do so. It is quite on a par with the grainer and his "badger softener," and is at the same time a splendid way of preparing these brushes for use presently in enamel or varnish.

The application of flat enamel, on the other hand, is altogether different. Here we have a material which is possessed of the property of flowing out, rendering the fine laying-off unnecessary. The principal aim must be to spread it as quickly and evenly as possible, and then leave it severely alone. Small sections, such as panels, etc., should be laid in freely, crossed once horizontally and laid off vertically with a firm hand. The edge should be kept alive and the laying-off done in a slanting direction from the edge inwards and never in the opposite direction, or you will get marks of the brush end, and flashes on the part which have commenced to "set." The soft, pliable pound brush which we used for the oil paint is quite useless for the application of flat enamel, or, indeed, for any of the flowing materials. A fine bristle brush which has been kept suspended in turps is the most suitable, and the larger the brush is, within reason, the better. It is surprising how easy an enamel will work in a four-inch flat brush, and how solid is the result. You will find that the larger the brush you can conveniently use the better and cleaner will be the result, and I am sure the governor will have no cause to complain.

The "setting" point of a material is one which must be quickly determined if good results are to be obtained. No doubt you have seen the "rucked" or "rippled" surface which a painter will obtain with a varnish or enamel with which he is not familiar. This is caused by passing the brush too lightly over the surface which has commenced to set, rucking it up. There is one way of removing this rippled surface and it must be done quickly. Wash out the brush in turps and twirl round until dry, then pass it firmly, but very slowly, over the surface,





starting at the bottom and traveling upward, just lapping over each stroke. The pressure must be sufficient to disturb the coating right through. It takes out the ripples and brings the under surface which has not yet set to the front. This will flow out and the situation will be saved. I have seen a nasty run taken from the middle of a flank wall by this method. It also demonstrates the correct way of laying-off a thick, quick setting enamel or varnish. Prevention is always better than cure, so the painter should learn to apply all flowing materials with a quick, firm hand, saving his lighter touches for those which do not possess any flowing ability.

PAINTING STEEL

Iron and steel, while not presenting to the eye the same porous condition as wood, are full of finely divided pores, and the same atmospheric influences which enter the pores of wood and cause it to decay are ever ready to attack the unpainted surfaces of iron and steel—in fact, the metal surfaces more readily combine with the oxygen and moisture of the air, forming what is rust or oxide of iron. Therefore, immediately after the sand blasting and cleaning of the surfaces should come the application of the first or primary coat, as this is the most important one from the preservative standpoint.

In the selection of a suitable primer it seemed but natural for the painter to be guided by the experience gained in the painting of locomotive tenders, and to follow the initial coats with practically the same process as with wooden cars, and so far as the subsequent coats are concerned, this practice was generally carried out in the earlier painting of steel passenger equipment. It is thought that an error has been made in this general practice, as will be explained later.

The schedule for painting steel passenger car bodies is as follows:

Before assembling, all parts made of iron or steel, including the roof, must be covered with one coat of primer. A second coat of primer properly thinned with turpentine, or similar material, must be applied to all surfaces, including those which are concealed when the car is completed. Wherever possible, this second coat must be put on after the sheets are in place.

After assembling, the outside of side and end sheeting must be covered with one coat of surfacer, the rough and uneven places glazed with "surfacer composition," four coats of surfacer being added, rubbed down with linseed oil and emery cloth, two coats of desired color material added, followed by striping and lettering, then finished with three coats of finishing varnish. The outside of the roof must be finished with one coat of heavy protective paint, followed by one coat of a mixture composed by volume of three parts of mixed ground color and one part of the protective coating used. The top surface and edges of headlining should be painted with two coats of some preservative or color paint.

LAMP BLACK AND CARBON BLACK

According to the definition in Webster's dictionary, lamp black is the fine impalpable soot obtained from the smoke of carbonaceous substances only partly burnt. This definition is correct from the chemist's point of view, covering also the substance known to the trade in this country and elsewhere as "carbon black." In the American trade the term "lamp black" is usually understood to be a soot deposited by the smudge process and made from oil, resin, or some other solid or liquid raw material. "Carbon black," on the other hand, is the term applied to a black deposited by actual contact of a flame upon a metallic surface.

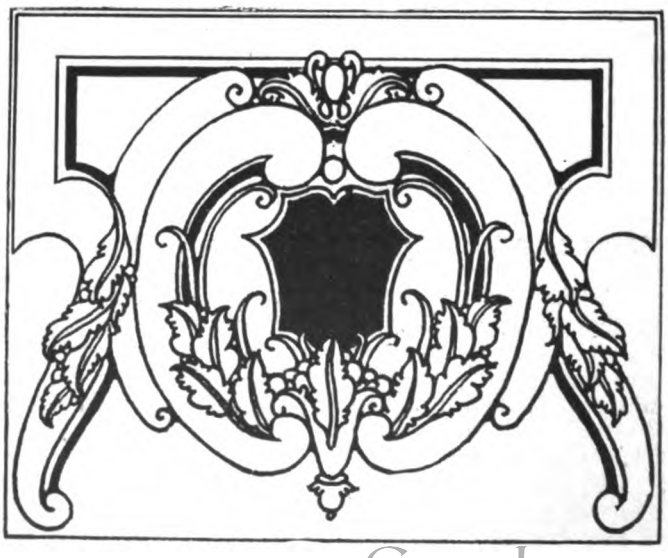
Using the term "lamp black" in its wider sense, as embracing any commercial form of soot, it may be prepared in three different ways—first, by the combustion of dead oil of tar, pitch, resin or some other carbonaceous raw material with an inadequate supply of air, and the collection of the floating particles of soot which escape unburned from the flame and slowly deposit themselves on the walls and floors of the collecting chamber; or second, it may be formed by the direct impact of a flame upon a collecting surface; and third, it may be formed by heating carbonaceous vapors to a decomposing point, apart from the air or flame.

Considering lamp black in its more restricted sense of a commercial soot, deposited by the smudge process from various dead oils, from 15 to 35 per cent. of its weight can be obtained in the form of lamp black by deposition in suitably arranged chambers.

The quality of the black is determined by the size and shape of the furnaces in which the oil is burned, by the heat to which it is subjected and other attendant circumstances. It has been found that the best grades of black, generally speaking, are obtained in furnaces of moderate size.

Still another source of lamp black is acetylene gas, obtained from the refuse of carbide of calcium factories. The irregularity of its supply and price limits its use to cases where its bluish tinge obtains for it a preference in certain trades.

Carbon black is the trade name given in this country, and to a certain extent abroad, to lamp black made upon the surfaces of metal or stone by direct impact of flame. The first carbon black produced in this country and sold commercially was made in 1864 by J. K. Wright, an ink maker of Philadelphia, for use in printing ink. This industry is thus a comparatively new one in this country. Mr. Wright made black on



sheet iron cylinders, revolved over gas jets, from which the black was removed by stationary scrapers.

The first process of commercial importance patented was that of John Howarth, who received in September, 1872, a patent for the manufacture of carbon black from natural carbureted hydrogen gas. Owing to the cheapness of the raw material, as compared with the artificial gas previously employed, the price gradually dropped from $5 to $1.25 per pound.

In the decade 1883-1892 the process of making carbon black introduced by A. R. Bland became the most important as to output and total value of black produced. The prices of black rapidly fell, reaching 7 cents per pound in 1887 and 4 cents in 1889. They then considerably improved, the total output at the close of 1902 reaching about 10,000 pounds a day, worth at that time on the average about 6 cents per pound.

The total value of the carbon black made in a year would, it is said, represent about one million dollars, while the total value of the world's output of lamp black would probably be two or three times as much. Yet the real importance of these two commodities to humanity is inadequately represented by these figures. These articles form the basis of black printing inks, are largely used in black paints and for coloring rubber, leather and other substances. Each has its distinct uses; carbon black being preferred for black ink, stove polish and vulcanized rubber. Lamp black is much better for coloring oilcloth, leather and certain forms of rubber, being much more widely used in paint than carbon black.

WASHING OFF VARNISHED SURFACES

As showing how little there is that is new to write about when telling a varnish story, we reprint observations by Mr. Hillick (in part) about washing a varnished surface.

All the writer sets down is exactly so, but the number of times it has been set down gives it almost the respectable age of a Mexican war veteran.

What there is that is really new about varnish is originated in the varnish maker's laboratory by his chemists, and it is rare indeed that such information gets beyond the doors of the varnish works. This is most natural, of course, but it makes varnish news a scarce article. Mr. Hillick writes:

During the next two or three months the finish on the automobile or other vehicle should have especial attention. The newly varnished vehicle will need frequent water baths. These, during the heat of summer, should be given in the shade and never in the bright sunlight. The water should be clean and cool. The manner of washing an automobile has probably been described before in these columns, but this much is pertinent at this time: Use plenty of water, but never from a hose at strong pressure. A gentle flow of water is all sufficient. Soften up all the accumulations and under an easy flow of water let as much of the dirt as possible run away. After proceeding to get the surface as clean as it can be washed with the hose alone, take a soft, fleece wool sponge and, using plenty of water, give the surface a very thorough sponge bath, cleaning off all the sediment and fine dirt. When the water becomes stained change to a clean supply at once, thus insuring a clean surface. Complete the washing operation by going over the surface with a fine rinsing volume of water. Dry off lightly with nice, lint-free wash leather. Do not attempt to rub the surface with the leather under the impression that all the water drops and moisture must be removed, for no such need exists. Catch off the bulk of the water adhering to the surface with the leather, leaving the mist and water drops to dissipate. Use the wash leather as sparingly as possible on the finished surface. The varnish will be all the better for it, and have a richer, deeper lustre.

PINLESS METHOD OF USING STENCILS

There are four ways in which stencils may be used without pins.

First—Cut all stencils from sheet lead. Sixty-four gauge is used by many, the 32 is thicker, but harder to cut; it will, however, stay in shape better than the thinner kind. Large and slender stencils are not practical when cut from lead. Hinge two boards together, place card in position and the stencils where wanted. Blow in the color, close boards together, turn over, remove card, put on another, close boards, turn over and repeat as often as you like. A mark should be placed on the board so the card has the right margins without having to measure.

Second—Get a number of small square metal slugs. After placing the stencils in position lay these slugs on them to hold them in place while airbrushing. Any sort of stencil can be used in this way.

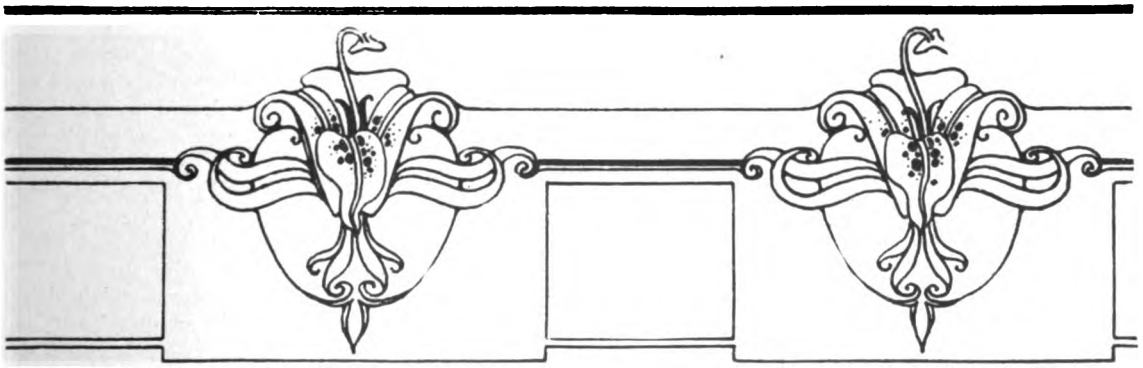
Third—Take a piece of ordinary screen wire, stretch tightly on a frame. If you have a frame that can be tightened up when loose so much the better. It should be a little larger than the card. It may be used just as it is, or part of the wires may be removed making a more open effect, if the coarse screen is not to be had. Place stencils in position and drop sealing wax on the back of stencils in enough places to hold it firmly on the screen. Lay on the card and blow color on through the screen. This method will leave the screen effect in the finished work.

Fourth—Take ordinary rubber cement, such as is used in mending inner tubes of tires. Thin some with benzine until it will flow well. Apply this to the back of the stencil and place in position on the card before it dries. Blow in the color, remove the stencil. Any surplus cement left on the card can be taken off with a rubber. This method is not practical for general show card work. Used mostly by engraving houses where extreme accuracy is needed.

QUICK METHODS

The factors in the painting and varnishing of a car are the speed at which the various coats can be applied, and the time occupied by each coat in drying. It is possible to "speed-up" the former by employing only the smartest and most expert workmen, and, to a limited extent, by the use of mechanical appliances by the use of high-temperature drying rooms.

In some factories the filling coats are applied very rapidly



by a compressed air spray. The body is mounted on a turntable stand, so that the operator directs the spray from a fixed position while the work revolves at the required speed in front of him. There is, with this system, a considerable waste of the filler, amounting to about 25 per cent. as compared with hand work, but the economy effected by saving of time is found more than to compensate for this.

Then in treatment of wheels, an apparatus has been designed consisting of a circular tank, made rather larger in diameter than the wheels, with a central vertical spindle, on which the wheel is mounted, and capable of being revolved at considerable speed. The wheel being mounted on the spindle, may be slowly revolved while the paint is being applied—which may be done by hand or by pouring on the paint through a pipe—and when completely coated, revolutions are increased so that all surplus paint is thrown off by centrifugal force and falls again into the tank. It may be objected that since the centrifugal force, tending to throw the superfluous paint outwards, is very much greater at the felloes than at the hub, such a method of treatment leads to uneven results, and that while too thick a coat remains on the hub, the felloes, where the greatest amount of paint protection is wanted, has the thinnest coat. It appears probable, however, that a certain amount of paint from the hub feeds down towards the felloes, and helps to equalize matters in this respect. Anyhow, the method has been found reasonably practicable, and appears to have the merit of economy, although, of course, its limitations are obvious, and being essentially suited to the manufacture of cheap types in very large quantities.

It is in their arrangements for rapid drying that factories effect their most important saving of time. For this purpose they have great drying rooms maintained at a temperature of from 125 deg. to 150 deg. F. Such a temperature, combined with a judicious circulation of air, makes the drying of paint and varnish coats a matter of hours—or even of minutes—and if, as seems to be the case, it is possible to manufacture special paints and varnishes which will stand this rapid rate of drying, the saving of time is very marked.

PAINTING ON COPPER

The coppersmith uses sulphuric acid, sal ammoniac and rosin in soldering the copper, and to prevent the copper from being discolored and darkened it is usually cleaned off with paraffin oil. Such a surface would not be fit to paint upon, and it is necessary to thoroughly wash with benzol or benzine, or a weak solution of nitric acid might be used. Copper has been treated successfully by giving it a coat of aluminum bronze, mixed with a first class outside varnish, and this is done on copper work that is to be gilded, and after seven years is in a good condition. Another way is to use Indian red and ochre mixed with one-third linseed oil and two-thirds varnish. It proves successful.

GREASE STAINS ON STEEL

Grease and stains can be removed from steel with a mixture of unslaked lime and chalk powder, by rubbing it on the steel with a dry cloth. The best proportion for the mixture, which is easily prepared, is 1 part of lime to 1 part of chalk powder. The powder should be used dry. It can be kept in cans for future use and can be used over and over again.

PAINT HINTS

Add aluminum bronze to a white or light paint that is to be used for lettering on a dark ground.

To remove paint from the hands it is better to use horse hair with a little kerosene to remove the paint, and then finish with soap and water.

SLUGGING THE SALES DEPARTMENT

Unlike E. F. Roberts, of the Packard Motor Car Co., who in his paper, "Automobile Production and Inspection Methods," declared that the sales department should be the positive and final arbiter of the design and saleability of a new model, F. E. Moskovics, who has had experience in both engineering and sales departments, and whose paper, read at the S.A.E. meeting, bore the title, "The Influence of the Sales Department on the Design of Motor Cars," asserted "that in many organizations the sales department wears a halo unwarranted by facts and bad in principle.

"This is due to many causes," he added, "the main one being that it actually brings in the dollars; it is apparently the department that creates the much sought dividends. Besides, it is the department that comes into contact and mixes with the outside world to the greatest extent. It is, or should be, better fitted to tell of its own importance and greatness than any other arm of the business; its business is the art of selling, and it can, or should be able to, sell itself as well as it praises and sells the product at its disposal. In other words, the sales department is the mouthpiece of the organization, the real point of contact between that final judge, the ultimate consumer, and the factory. Naturally, this condition ofttimes becomes galling, especially to one so little given to the study of environment as the average motor car engineer. The result is lack of regard for the ideas, views and opinions of one department for the other. Of course, no lasting benefit can come from such a relationship.

"In the past the average sales department has had little real knowledge of the art of motor car building; what it gleaned was of a purely superficial and perfunctory character, usually limited to parrot-like repetition of a few technical platitudes called for want of a beter name 'talking points.' No systematic attempt was made to thoroughly ground the salesman in the rudiments of the profession, nor did he, for lack of initiative and time, obtain the information on his own account. How few salesmen of even today have a real general knowledge of the basic facts of the business!

Motor Cars Must Be Sold, Not Bought

"The day is, however, rapidly approaching, if indeed it is not already upon us, when motor cars must be sold and not bought. The buying public becomes carwise and, knowing what it wants, has little respect for or patience with the man who cannot explain in a clear, concise and logical manner the different points of a car that may come up for discussion. . . . The merely magnetic talker has seen his day.

"As illustrating the kind of salesman who cannot succeed today, the following story of a few years ago will perhaps suffice: Jones, the star salesman of a prominent foreign car, was asked by a prospective buyer what form of ignition was used on his car. 'Low-tension make-and-break," he responded. 'What is the difference between low-tension make-and-break and high tension?' the customer inquired. Jones was momentarily nonplussed (here was a point that his motoring education had not covered), but only for an instant. 'Are you an electrical engineer?' he asked. 'No, I can't say that I am,' Mr. Buyer replied. 'Then, really it would be quite useless for me to atempt to explain it to you,' said Jones. When Jones told me the story to show how clever he was I asked him what he would have said if the prospect had said that he was an electrical engineer. 'Why,' said Jones, 'I would have told him, "Then you ought to known more about it than I do."'

DESTROYED BY STORM

The Elba (Va.) Wagon and Buggy Co. had the misfortune of losing their warehouse and entire stock of vehicles Saturday night, July 5, during the heavy storm which visited that vicinity. As the storage house was built of metal and concrete flooring it was considered practically fireproof, consequently no insurance was carried on the stock or building.

Smith Shop

SPRINGS

Tires are more affected by the action of the springs than by anything else, both as regards wear and bursting. Regarding the subject of friction, the following appears to be a remarkable inconsistency in ordinary practice. It has generally been held that friction in a spring is to be avoided. The driver is advised to keep the spring leaves well greased, and there is a special tool on the market for opening the leaves to enable this to be done. It is said to be an advantage for the spring in its normal condition to be nearly flat, and the author in a paper read before the Institution of Automobile Engineers, say he has always supposed that the object of this was to diminish friction, because the motion of the leaves over one another is a minimum for deflections from the flat condition. On the other hand, there are a large number of devices on the market for introducing friction, and some makers fit them as standard to their cars.

The inconsistency may, perhaps, be explained by saying that the friction devices do not introduce sensible friction for small deflections, and merely serve to prevent excessive deflections by damping out the rebound from one deflection, so that the effect of successive obstacles is not cumulative.

This is not altogether a satisfactory reply, because, to be effective in damping out the rebound, the friction must be considerable, even for a moderate deflection. All that can be said is that if, by the use of a friction device, a weaker spring can be employed than would be the case without a friction device, this gives some advantage to compensate for the disadvantage of the friction. One thing is nevertheless clear, namely, that, given a car sold by the maker without a friction device and with a spring of suitable strength, it must be bad to fit it with a friction device and leave the spring unaltered. If the spring is not too weak, its rebounds will not be excessive, and the attempt to diminish them by adding a friction device does not, therefore, give any appreciable advantage to compensate for the disadvantage of the friction.

The conclusion come to is, then, that friction devices of the kind mentioned—namely, those which give constant friction or friction increasing with the deflection, are bad.

There are, however, two other kinds of friction device to which this conclusion does not apply. First, comes the fluid friction device, which has been put on the market in many forms. This gives friction varying as the square of the velocity, so that when the velocity is very small the friction is negligible, while the friction becomes large only when the velocity is high—that is, only when the car gives a very big swing. Such a friction device will not cause any jerk as the velocity of the car upwards exceeds that of the axle, and therefore avoids the chief objection to friction devices. It also becomes rapidly more effective just as it becomes more needed—that is, as the swing increases, and it should be possible to employ a weaker spring, and trust to the friction device to keep the maximum deflection within proper limits.

The fluid friction device appears to be an excellent thing, and the only trouble about it is that it will not work in practice. The viscosity or internal friction of liquids, which is nearly the same as their friction in passing through a small orifice, rises so rapidly with the temperature that the friction acquires widely different values according to whether the car has been standing or has been running over a bumpy road. The only two liquids used are oil and glycerine. The viscosity of glycerine at 26 deg. C. is one-fifth of what it is at 8 deg. C. As the temperature would rise above 26 deg. C. after the shock absorber had done very little work, it is evident that a glycerine-filled device cannot be of any use. Oil is much worse because it freezes solid, and the shock absorber promptly breaks on starting out. The ineptitude of selecting the two substances which show exceptionally large variations of viscosity with temperature is quite remarkable. Mercury would be the best liquid, but its viscosity is only about one-four thousandth part of that of glycerine.

A liquid friction device with mercury as the liquid would be quite practicable, and might be of considerable advantage, provided always that both it and the spring were designed together.

The other kind of friction device is that which comes into action only on the rebound. It consists of a leather strip fixed to the car at one end, passing under the axle and hanging at the other end on a spring fixed to the car. In the normal position of the spring the leather band is quite free, the spring exerting no force on it. Therefore, for any compression of the spring from its normal position, it comes against the leather band, which rubs round it with pressure increasing with the rebound deflection.

The objection to this form of device is that it may be good for a hump in the road, but it must be extremely bad for a hollow. The kind of friction device that is wanted is one which comes into action only after the first big deflection in either direction, but there would be little chance of its working if it were ever designed.

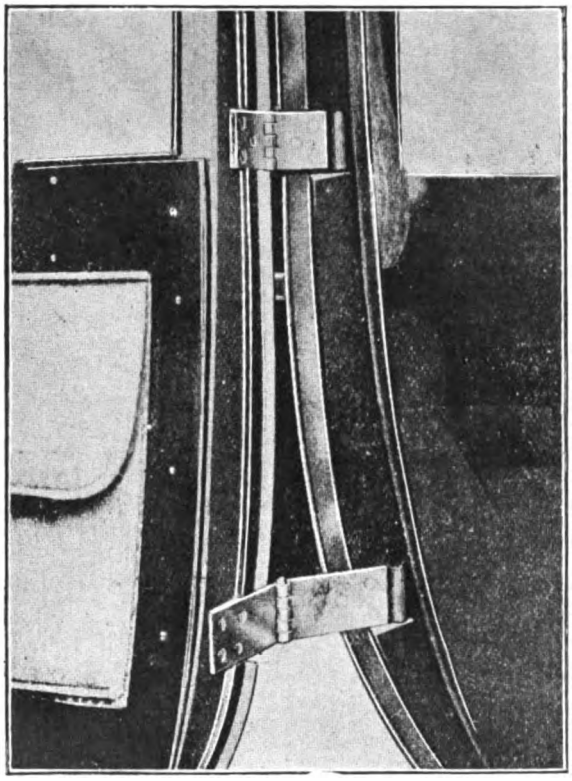
Turning now to springs in general, the essential data which have to be settled in a spring are the maximum deflection which the chassis will admit and the maximum load to be assumed, which must be some multiple of the weight of the car. These two fix the strength of the spring. Therefore, the weight being fixed, the larger the maximum deflection which can be allowed the weaker the spring can be. There is no question but that the weaker a spring is the more comfortable the car is, and there is little doubt but that the weaker a spring is the better it is, taking everything into consideration. In saying this, the liability to roll must, of course, be taken into consideration in settling the maximum load to be allowed, and an allowance must be made for the springs to sag.

Apart from questions of friction, the comfort of a car may be said to depend on the distance between the axle and frame and between wheel and wing, that is, on the possible deflection of the springs. This distance has a comparatively small limit, though the possible distance which the chassis construction would allow is frequently diminished by trivial detail. If the maximum distance possible with a reasonable chassis construction has been allowed, improvement in springing can only be obtained by providing a spring with a larger deflection for the maximum load than the car will allow, and fitting some device to prevent a deflection occurring which would bump the axle. The simplest form of such device is the rubber buffer. It is, of course, equivalent to a strong spring which adds itself to a leaf spring when a certain deflection is passed, and a metal spring might with advantage be substituted for it. Properly, a similar buffer or spring should be fitted to prevent excessive deflection in the opposite direction. Devices of this kind seem to flourish in France. The advantage of this type of device is that it is normally out of action and does not interfere with the proper working of the spring. It comes into action only on rare occasions, and it is of no consequence if it then causes a bad jerk. A fluid frictional device seems the only good alternative.

Friction should be diminished as far as possible, and with

this object spiral springs might be used more than they are to take a portion of the load.

SPRING DOOR HINGE



We illustrate an English patent hinge that has interest. It will absorb jar and rattle, does away with rehanging and looks like a desirable accessory altogether.

VISE LEADS

For the ordinary finishing of forged or other work the plain jaws of the vise fill the bill fairly well; but when it comes to securing smooth or finished surfaces, such as axle spindles or finished journals, there must be a device of soft metal with which to hold the article in the vise. In many cases pieces of brass, zinc or copper or plain sheet iron are used. However, there is nothing so well suited to the purpose as lead. The best finished surfaces may be handled with leaden vise jaws without leaving a mark upon them.

The part which fits the jaws is ½ or ⅝ inch thick, about 1¼ inches wide, and as long as the jaws of the vise.

WIRE WHEEL RUST

As might have been expected one of the difficulties that caused carriage builders to look askance at wire wheels is now cropping out.

The washing of such wheels, especially if much clogged with dry mud are not easily dried as the washer is in the habit of drying them, hence rust sets in. Now we are getting recipes for preventing rust, so it is plain the old troubles are bobbing up. Here is one plan:

That old saw about the virtues of an ounce of prevention well may be applied by users of wire wheels to obviate the rusting which is likely to take place where the spokes cross one another. Regardless of the quality of the enamel that is used, constant vibration is likely to cause it to chip, and where it chips the spokes will rust and in time they will break if the rust is permitted to eat its way into the metal. The ounce of prevention consists of the application of successive coats of thin, hard enamel, say once or twice a season, or as often as the existing enamel shows signs of chipping or wearing off. Almost any good enamel produced for use on metallic surfaces will serve the purpose, and it should not be put on too thickly or it will show a tendency to chip easily. The better way is to apply several coats of very thin enamel, allowing each to dry thoroughly before the next is put on.

The drying process is an important part of the work and should be given ample time.

USEFUL TOOL FOR IRREGULAR CUTTING

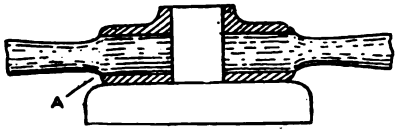
A tool which is extremely useful for cutting irregular forms from thin sheet metal, gasket material, paper and the like can be made like the well known glass cutter with a sharp-edged little wheel. The cutter wheel, however, should have a diameter of about three-eighths or half an inch and should be mounted in a good, heavy handle, on a heavy spindle, so that it will stand considerable pressure. For the wheel a small knurling tool blank answers very well. It should be thin so that there will not be too much material to remove in forming the cutting edge. The edge may be formed by holding the disk against a grindstone or emery wheel in such a way that the edge is beveled, the disk rotating at the same time by friction with the stone or wheel. The angle should be about 35 degrees for general purposes. This will give a good, sharp edge but one that will not readily break or chip off.

Such a tool is very useful for following an outline previously marked off, or it may be used in following the edge of a template or pattern. It is easily kept running straight or in a uniform curve and, if well made and properly used, will leave a clean, smoothly cut edge.

STRAIGHTENING AN AUTOMOBILE WHEEL

Through accident, warping or poor construction, the road wheel of a car may run out of true sideways. Where the hub is not bent, a simple correction can be made until such time as the wheel can be put out of service and the spokes reset or replaced.

Ascertain which is the high side of the wheel, loosen the bolts that hold the flange and hub and fill in with paper, cardboard or tin, AA, then tighten and test, repeating the operation until the wheel is straight. The drawing shows a liner inserted on two opposite sides. At the highest part the greatest thickness should be used, tapering off until the ends of the packing extend under about one-half of the circle. Shellac or paint is good to use in connection with the paper filling.



Thin Wedges, Placed Under Opposite Sides of the Hub Flange on a Wheel, Straighten the Rim

MORE TIRE SETTERS IN THE SOUTH

The West Tire Setter Co., of Rochester, N. Y., report that among their recent sales were two machines for the Southland, one having been furnished to the C. D. Franke Co. Carriage & Wagon Shop, in Charleston, S. C., and one to Mr. F. Chris. Kramer, Savannah, Ga.

Mr. E. A. Grenell, secretary and treasurer of the West Co., who made an extended trip through the south in April and May, says that while he found a certain amount of prejudice in the south against cold tire setters it was due almost entirely to the unsatisfactory results obtained with the cheaper machines of which quite a number were sold in the south some

time ago, but that he did not find a single dissatisfied user of a West hydraulic tire setter during the whole trip.

Nearly all of the principal carriage and wagon factories in the southern states are using West machines. They do "an hours' work in a minute."

WRINKLES

A few small teeth filed in the back edge of a carpenter's saw are very handy for cutting off nails when repairing old work.

A novel means of soldering aluminum has recently been invented. The solder is aluminum or an aluminum alloy with a flux consisting of 30 parts cryolite, 35 parts common salt and 35 parts potassium chloride. The solder is made in the form of a tube, inside of which the flux is placed, and these melt together when the tube is heated. The novelty of the invention lies in placing the flux inside the tube.

DOOR STOP

An apparatus of English origin named the Dowley has been made for fitting to the doors of motor vehicles to avoid rattling. They are fastened flush to the top and bottom of the pillar. An advantage of these stops is that they prevent the door being accidentally left open. This silencer is made of brass. It consists of a plunger working against a spring which is enclosed in a socket provided with lugs for attachment to the pillar.

CEMENT FOR LEATHER BELTING

Common glue and American isinglass (not mica), equal parts. Soak for ten hours in sufficient water to cover them. Bring it to a boiling heat and add pine tannin until the whole becomes ropy or appears like the whites of eggs. Apply it warm. Buff the grain off the leather where it is to be cemented, rub the joint surfaces solidly together, let it dry a few hours, and it is ready for use. If properly put together it will not require riveting.

STRESSES AND HOLE DRILLING

If we cut half way through a bar from the top and fill up the cut with an equally strong material, the bar would still carry the same weight on the top; but if we cut half way through from the bottom it will only carry one-fourth the weight, and a hole drilled or punched through a plate weakens it in the same way, according to the distance it is above or below the middle, that is the neutral line of the beam.

ANY STAMPS NOW ON ANY KIND OF MAIL MATTER

Any postage stamp is now good on parcel post packages, and parcel post stamps are good on all classes of mail, according to an order of Postmaster General Burleson which went into effect July 1; heretofore ordinary stamps have not been good on parcel post packages and parcel post stamps have not been good on letters. The new arrangement will render a convenience to those using the service in that any postage at hand will be usable on any class of mail matter.

There also went into effect July 1 the collect-on-delivery rule, whereby goods may be sent and their price collected and remitted to the sender by the post office of delivery. There are, however, certain regulations to be observed under Section 66 of the parcel post regulations.

The sender of a mailable parcel on which the postage is fully prepaid may have the price of the article and the charges thereon collected from the addressee on payment of a fee of 10 cents in stamps affixed, provided the amount collected does not exceed $100. Such a parcel will be insured against loss, without additional charge, in an amount equivalent to its value, but not to exceed $50. The sender of a collect-on-delivery parcel will receive a receipt showing the office and date of the mailing, the number of the parcel, and the amount due him.

C. O. D. parcels will be accepted for mailing only at a money order post office and when addressed to a money order post office. If a C. O. D. parcel is received at a non-money order post office the postmaster will notify the office of mailing of the amount of postage required for its return. The postmaster at the office of mailing will ascertain from the sender whether he desires the parcel returned or delivered without collection of the charges. If the sender notifies him in writing that the parcel may be delivered without collecting the charges, he will attach the order to the office coupon and notify the postmaster at the office of address to that effect.

A C. O. D. parcel will be treated as ordinary mail matter until it reaches the office of address, where, on payment of charges, it will be delivered to the addressee, or, unless otherwise directed by the addressee, to the person, firm, or the corporation in whose care it is addressed, or to any responsible person to whom the addressee's mail is ordinarily delivered.

The addressee will not be permitted to examine the contents of a C. O. D. parcel until it has been receipted for and all charges paid. A parcel may be refused when it is tendered for delivery, but after delivery has been effected it cannot be returned on account of dissatisfaction with the contents or the amount collected. The Post Office Department will not be responsible for errors made by senders in stating the collection charges or for any misunderstanding between the senders and addressees regarding the character of the contents of parcels.

The cumbersome and inconvenient parcel post stamp regulations were adopted to give the government a line on the volume of matter carried by the new department, and now that this information has shown the popularity of the parcel post the stamps will be discontinued, it is stated, when the present supply is exhausted, which time is not distant.

A REMARKABLE ENGINE

Ever since the introduction of the internal combustion engine, engineers have railed at the cumbrous—yet effective—four-cycle system of construction, and it has been said more than once that the ultimate engine, when it arrives, will be of the two-stroke order. Hitherto, investigators have sought the ideal in vain, as well in this direction as in another, to wit, the much desired variable compression. The latter, when attainable, is admitted to be an ideal method of control, as varying the compression would result in varying the engine power in accordance with requirements; but the means to the desired end have been wanting, while the two-stroke motor has failed to compete with its rival owing to its comparative inefficiency, due to the impossibility, with known methods, of securing an effective scavenge of the burnt gases, and, consequently, a perfect charge, as well as owing to the difficulty of getting sufficient compression for the charge. But, says Motor, of London, Eng., we have just seen the drawings of an engine which has got beyond the experimental stage, and which will shortly take its place in the market as a commercial commodity, which appears to open up remarkable possibilities for the future, and which, conceivably, may even revolutionize engine construction. While it works on the two-stroke principle, exploding and exhausting its charge at each revolution, it is claimed that it gets an absolutely perfect scavenge of the burnt gases, as well as not only as high, but a higher—if required—initial compression of the charge than is usually obtained with the four-cycle type; while, in addition, the compression is infinitely variable from about 15 lbs. to the square inch upwards. Furthermore, while there is no carburetor, the quantity of the fuel used varies with the compression, thus

getting a mixture correctly graded to meet the varying requirements, and, what is more, the engine will work equally well with gasoline, benzole, paraffin and even crude oil. In addition to all this, the flywheel—for the first time in the history of the gasoline engine other than rotary engines which are their own flywheels—is abolished, and a four-cylinder, water-cooled, verticle engine, with 90 mm. by 130 mm. cylinders, is stated to be capable of developing nearly 100 horsepower when let out. Another feature is the embodiment in the design of the engine—and not as an afterthought—of a pneumatic self-starter, which will work at as low a pressure as 20 lbs., and the clutch as well as the flywheel "goes by the board." All this seems, at first sight, very much too good to be true, but the inventor has had a car on the road fitted with it now for several months, and he assures us that it is in every way as stated, and that, in practice, it shows 30 per cent. to 40 per cent. higher fuel efficiency than is obtained with the conventional engines.

ADVERTISING MORE THAN DOUBLED A DEALER'S TRADE

A dealer in implements located in Tennessee three years ago sold six buggies during the whole season. Two years ago his sales started out the same way with no prospect for a larger number. About the middle of the season he asked the advertising manager of a buggy company why he couldn't sell more.

"I'll tell you what I'll do," said the advertising man, after a short conversation, "I'll write you up a series of advertisements that will sell buggies for you."

He wrote up a series of eight ads, one to run each week, which applied to the conditions in the dealer's territory. They were goods ads, the kind that result from a knowledge of goods and conditions. They pushed the sales up to eight for that season even though they were started late.

The next season, last year, the advertising manager worked up carefully a series of advertisements which were to run the entire time. The dealer became more and more of an advertising enthusiast as sale after sale was made until at the end of his season his sales total showed that 42 buggies had left his store. Is he advertising this year? He has stocked up with several carloads and expects his advertising to sell them and more, too.

FASHIONS IN COOLING SYSTEMS

There is a tendency to increase the size of cylinder casting water passages, and the popularity of thermo-syphon has had somethir.g to do with this. Although more makers than ever have given up the use of a water pump, there are still quite a large number who prefer to retain it, even on small engines, and a car can be made lighter if it has a good pump. In few instances is there sufficient head of water to make a thermo-syphon system safe, for usually it would be essential to keep the radiator full to the extreme top in order to ensure circulation, and the loss of less than a pint of water would often cause the outlet from the cylinders to the radiator to become uncovered. Water pipes for natural circulation have grown in size, and a rough and ready rule would appear to be to make the cross-sectional area of the outlet and inlet pipes, at their smallest, equal to form a quarter to a third that of the piston. Where very tapering pipes are used with pair cast cylinders it has sometimes been found difficult to obtain good cooling of the hinder pair, owing to the water taking the easier path through the front pair where the pipes are at their largest.

Engines with pump circulation exhibit alteration in that the pipes are now generally larger, and the pumps also have increased in size, which is a most curious fact by comparison with the popularity of natural circulation. The advantages and disadvantages of the two systems are not very pronounced. Contrary to popular opinion, there is no reason why large engines should need pumps more than small engines, if the proportions are kept the same, but where pumpless large engines are seen, it is also to be observed that the radiator and pipes are enormous, and consequently heavy. Had it not been for the small and inaccessible pumps often fitted a few years ago, probably thermo-syphon circulation would never have gained as it has. All things considered, it is not a true simplification, and it is likely to be long before either system displaces the other completely.

Radiators still vary in design very greatly, though the vertical flat tube type without gills is becoming very common, so much so that the gilled tube bids fair to disappear, leaving the honey-comb as sole competitor.

REMARKABLE STUNT BY ENGLISH ARGYLE

We quote here a racing performance on the Brooklands track by Argyle, a sleeve-valve, worm-driven motor. Neither of these adjuncts were considered fit for racing by the wise ones. The report is from The Motor, and it makes the sleeve valve and worm drive spotlight features.

The model raced was the standard type 15-30 h.p. single sleeve-valve engine, and, as a still further meed of praise, the worm drive was retained, and it is certainly quite the exception for this transmission to be employed for racing purposes. Incidentally, at the end of the run, the casing was perfectly cool. The bore and stroke of the engine are respectively 80 mm. and 130 mm., the ordinary standard size, and in class D it was successful in creating a 12 hours record, averaging 72.58 miles per hour, and it also had the great satisfaction of actually creating a world's record for the 14 hours, covering a distance of 1,016 miles 437 yards, the average speed for the extra two hours even increasing a fraction to 72.59. The fastest lap was covered at a speed of 80.72 miles per hour, a figure (for the size of the engine) which must once and for all entirely refute any adverse criticism of, at any rate, this sleeve-valve engine as regards high speed work. In the last ten hours the maximum variation of speed from any one hour in the group to any other hour was only .3 miles per hour, a most startling and emphatic testimonial to the truly remarkable regularity of running.

PUZZLED BY PRICE-CUTTING SITUATION

Ever since the recent decision of the United States Supreme Court in the Sanatogen case, which decision holds that the owners of a patent cannot control the resale price of their goods, speculation has been rife in the manufacturing world, and to provide a means for learning the position in which manufacturers now are and to provide for other matters relating to the marketing of patented or trademarked products, a meeting of about 25 manufacturers, manufacturers' representatives, attorneys and other interested persons, was held in New York City. While the Sanatogen case may not have been the only thing discussed, it is admitted by those concerned that it hastened the meeting, which had previously been considered, and the interest aroused is indicated by the fact that while the conferees gathered in the morning and expected to be through by noon, the session continued well into the evening. And the conferees state that they do not yet know just where they stand in relation to price maintenance.

ASSEMBLED CAR

The vehicle trade knows Mr. A. Freschl, of the Novelty Tufting Machine Co., in Detroit, very well.

Mr. F. is going to introduce a car of the assembled kind, but the component parts, like postum, will be "different."

Europe and this land is being searched for its best. There will be a Baines motor and clutch, a Baker solo hood, Buch K. D. metal body as some of the good parts already assembled. The car will be named the Freschl Utilities Car.

DISHONEST ADVERTISING

Advertising men themselves have now realized the necessity for regulation, and have taken the first practical steps toward this end. The common law and general status in regard to fraud and false pretense are supposed to cover the question of deception in advertising, but in practice these have not been sufficient. Therefore, Printer's Ink, a publication devoted to the advertising business, encouraged by organizations of advertising men who realized that it was to their interests and even essential to the life of the advertising business that fraud should be eliminated, had prepared a model law intended to overcome the weakness of the common law and general statutes as applied to advertising. This model law is as follows:

An Act Relative to Untrue, Deceptive and Misleading Advertisements

Be it enacted, etc.

Any person, firm, corporation or association who, with intent to sell or in any wise dispose of merchandise, securities, service, or anything offered by such person, firm, corporation or association, directly or indirectly, or with intent to increase the consumption thereof, or to induce the public in any manner to enter into any obligation relating thereto, or to acquire title thereto, or an interest therein, makes, publishes, disseminates, circulates, or places before the public, or causes, directly or indirectly, to be made, published, disseminated, circulated, or placed before the public in this state, in a newspaper or other publication, or in the form of a book, notice, hand-bill, poster, bill, circular, pamphlet, or letter, or in any other way, an advertisement of any sort regarding merchandise, securities, service, or anything so offered to the public, which advertisement contains any assertion, representation or statement of fact which is untrue, deceptive or misleading, shall be guilty of a misdemeanor and shall be punished by a fine.

Through the action of vigilance committees appointed by advertising clubs throughout the country, this model law has been embodied in a bill and introduced into the legislatures of a number of states. This bill, where introduced, has been reported on favorably by the legislative committee to which it was referred, in all states except South Carolina. The bill, with slight modifications which in no wise seriously impair its effect, has been enacted into a law in Ohio, Minnesota and Washington. April 26 the first case under the new law in Minnesota came up in the district court in Minneapolis. A local shoe store was accused of having advertised a certain line of shoes in a manner declared to be fraudulent. The vigilance committee of the organization of advertising men furnished the evidence on which prosecution was based.

In Maine the bill with some changes was passed by both houses of the legislature but was vetoed by the governor. When the attempt was made to pass it over the governor's veto, it lacked one vote of being carried.

While the bill was received with the greatest favor in all of the states in which it was introduced, and in Congress as applying to the District of Columbia, yet in some states, probably through the influence of those who oppose any legislation of this sort, efforts were made to change the bill. In Indiana, New York, Oklahoma, Pennsylvania, South Dakota, Utah and West Virginia attempts were made to amend the model bill by inserting the word "knowingly" and in the bill affecting the District of Columbia the word "wilfully," which would, of course, greatly weaken the force of the measure by making it necessary to establish the fact represented by those elusive terms. In Oregon an attempt was also made to cripple the bill by making it necessary to find some one who is injured by the advertising complained of. While these changes do not at first sight seem unreasonable, they make exactly the loop-hole of escape for the dishonest advertiser which it is desired to avoid and they are not needed by the advertiser who wishes to be truthful in his advertising. Such terms were intentionally left out of the model bill by its framer.

It is the word "knowingly" which has rendered an existing statute in the state of New York practically a dead letter, and the vigilance committees of the advertising organizations in that state in attempting to enforce the law have had that difficulty to overcome. Pennsylvania and Massachusetts have enacted statutes embodying the word "knowingly," and in that respect have practically nullified their efforts to regulate the advertising business. In Missouri the model bill was introduced and promoted through the influence of the National Federation of Retail Merchants, but was voted down in the legislature without much discussion. One or two members said they did not believe it was a good bill. It is asserted that the bill was killed through the influence of the newspapers in the large cities, as every member from Kansas City, St. Louis and St. Joseph voted against it. The legislature passed a "blue sky" law to prevent the selling of bogus stocks and bonds, but would not stand for a law to prevent advertising them. In view of the fact that the state of Missouri and particularly the cities named, as well as Joplin in the zinc district, are hotbeds of advertising quacks, the failure of the statute against fraud in advertising is to be deplored.

The governor of Maine gave among his grounds for vetoing the bill that as enacted it was "too drastic a departure from the usual type of criminal statutes against practices, in that neither fraudulent intent nor actual injury to any one was regarded as an element of the crime created." He did not "believe that public policy required that the business world should be subjected to this hazard of criminal libaility for acts which the most honorable and careful man might occasionally commit without harm to anyone." He called attention to the fact that the terms usually employed in criminal statutes, such as "knowingly," "wilfully," "maliciously," "with intent to defraud" and "with intent to deceive," were not included in the act. He believed that such a law would unnecessarily discourage the genius of the American people for advertising, and that it would be difficult to find a jury that would convict or a court that would impose a fine for a publication that might be construed as "misleading." It was his conviction that the statutes already existing were sufficient, and if not, they could be amended so as to meet all demands.

Aside from these lawyers' objections to the bill, the opposition has come chiefly, as might be expected, from the "patent medicine" interests, from the loan sharks, clairvoyants, those having fraudulent stock schemes, and others who feel that it will curtail or abolish their business, which, it would seem, would be a most desirable effect of the law. Some objections were also raised by the publishers of newspapers and periodicals, who felt that the law would penalize them for publishing misleading advertisements; but this, it is declared by the author of the bill and by those in a position to judge, would not be the effect of such a law. The purpose and effect of the law would be to place the burden of guilt on the originators of the advertisements, those intending primarily to profit by them, who should bear the responsibility for publishing untrue, deceptive or misleading advertisements. To overcome this objection of the newspaper, an amendment to the model bill was enacted in Washington especially exempting newspapers and periodicals from the penalty of the act. Though this is believed to be entirely unnecessary, it in no way impairs the effect of the law. The advertising men's associations, through their vigilance committees, have exercised, as far as possible, a beneficial censorship over the advertising matter handled by them, and where this model bill has been enacted into a law, they are actively engaged in seeing that its provisions are carried out.

ALL GLASS LAMP

The general appearance of the lamp is that of the bullet type. The glass body is finished, on the inner surface, in any color desired, which may be the color of the car or brass, gold, nickel, copper, etc. The finish cannot dull or tarnish, so that wiping off the outside with a damp cloth is all that is neces-

sary to keep the lamp looking its best. The reflector is a truly molded parabola with the silvering on the surface furthest from the bulb and is as easily cleaned as the body. A hose can be turned on the lamp without injuring it.

In the space that is left between the reflector and the body, which are connected in the same general way as the two parts of a vacuum bottle, there is a vacuum which serves more than one purpose. It preserves the finish of the body and the silvering of the reflector indefinitely, and it prevents the interior of the lamp from heating under the rays of the sun and the exterior from becoming hot from the radiated heat of the electric bulb which is the source of illumination.

THINGS NOT WHAT THEY SEEM, SKIM MILK MASQUERADES AS CREAM

For instance, the pneumatic tires that came so high because they were "pure Para" may turn out to contain only 20 per cent. of that article, and so fetch little in the second-hand market. The balance is likely to contain about 40 per cent. of textile fabric, 20 of talc, magnesia, and baryta, and 17 of sulphur. This may be nearly all removed by proper treatment, mechanical and chemical. Says Mr. Main, an alleged expert:

"The caoutchouc thus obtained is not completely regenerated to tell the truth. It may, by taking the precaution to use no cast-off rubber but that of good quality, be rolled into sheets by adding some oil to soften it. It may be used in cheap mixed rubbers to make laboratory corks or washers for the joints of pipes. But rubber of good quality can never be recovered in this way. There remains, in fact, in the partially purified gum, not only a notable quantity of mineral matter, which would be only a small inconvenience, but, what is much more serious, a large quantity of combined sulphur, which prevents the rubber from sticking to itself. . . . Thus it is absolutely indispensable, to really recover the old gum, to remove the sulphur, which is an extremely difficult operation."

Although hundreds of patents for thus "devulcanizing caoutchouc have been taken out, none of them has perfectly solved the problem. Mr. Main says that no one yet knows exactly in what vulcanization consists; nay, more—no one knows precisely what India rubber itself is; at least, what is its "degree of polymerization"—a chemical term that Mr. Main translates by the word "nerve." This nerve may be lost by simply dissolving the rubber—a process that alters its chemical composition in no respect. No wonder that the substance is hardly itself again after so much maltreatment, physical and chemical. Some inventors try to act on the sulphur with alkalies or with pulverized metals; others dissolve it with hydrocarbons of various kinds. In our own country, where the "regeneration" of old rubber is carried on widely, various processes are used, most of them secret.

"In the United States there are several factories where 'regenerated rubber' is made in large quantities. The manufacturers of that country buy over old rubber and sell it back made over. At present there exist in Europe only three or four factories of any importance, and the numerous attempts to install processes more or less protected by patents generally end in bankruptcy. Naturally, we do not know precisely how the operators devulcanize their waste rubber; so far, the methods are mostly kept secret. In general, it seems that textile fibers and sulphur are eliminated with alkalies, which injure the gum less than acids."

JUST THE SAME HERE

E. C. Harvie read a paper before the Carriage Builders', Wheelwrights', and Motor Car Builders' National Association of New Zealand, on price cutting. We take the extract from the Australasian Coach Builder and Wheelwright:

It would, I think, be reasonable to assume that the practice of price cutting is attributable to one of three conditions: Unfriendly relations, ignorance of cost, and the want of a knowledge of salesmanship. In no other business is a man so quickly reduced to his proper level as in salesmanship; he cannot continue for long on a false plane. Of what use our manufacturing if we have not the ability to sell our goods? To a great extent selling anything is a battle of minds, and the more forceful personality generally wins. It is often the experience of the man who sells his own vehicles that, for some reason or other, probably want of confidence in the goods or his ability as a salesman, at the critical point of naming the price to the customer, something prompts him to name the very lowest price it is possible for him to accept. A vehicle is worth, say, £35. The prospective buyer will perhaps discount it all he knows how by remarking on its general unsuitability and deficiencies in certain respects (and which in some cases almost become apparent to the salesman); he feels he must make the sale and quote, say, £30; the bargaining begins, and perhaps £28 is accepted. When this point is reached, it is frequently found necessary to take in an old vehicle, often at its full value, to complete the deal.

It is often said that a man with a small business has a better chance to make money than a large concern, but I think it very questionable, and for this reason. Men succeed only as they utilize the services and ideas of other men, and the man who recognizes this vital essential in the building up of a business, instead of concentrating his efforts in excelling in the matter of the quality only of the vehicle he produces, will soon forge ahead, make more money, and will be less likely to cut prices than the man who works at his own branch of the trade, and who does his own bookkeeping, collecting, buying and selling, working long hours, often much hampered by shortage of capital. It must prove most disconcerting to the man who regards his business strictly from a business point of view to have to contend with the attitude of the man who will not discard the journeyman idea that all over the cost of labor and material is profit, and that it is quite unnecessary to add 5s. or 6s. 8d. for every £1 expended in these items for running expenses.

It seems like discounting a man's natural ambition to get on and be his own boss, but it is the small man who is most often guilty of cutting prices. Loyalty to the trade and a proper estimate of his ability to run a business after a few years' experience should make him decide in some cases to pull out and get into his proper groove. A man who engages in the coach building trade is usually a tradesman, who acquires a knowledge of buying and selling as he goes along, and at the outset the bulk of his time is occupied with producing something, literally.

His attention is taken up with the work he has in hand and looking after a few men, and the buying of material and the selling of his goods are matters which he is called away from his job to attend to frequently when his mind is absorbed with the work he has left. In such a case a buyer especially would have him at a disadvantage, and the man most likely to get the best of the deal is the man keen on buying. He makes an offer and gets a bargain, perhaps because money is badly wanted. The work inside the factory has received so much attention that the finance has been neglected. Estimates for repairs are often given under the same circumstances—and perhaps approximately; and how often do these approximate quotations become a matter of dispute first, and subsequently resolve themselves into fixed charges.

SOME WIRING

In some of the modern motor cars, equipped with electric self-starters and electric lighting systems, enough wire is used to wire a six-room cottage. On each of his cars, one maker employs 110 feet of wire, 50 feet of which is in the primary system, 20 feet for headlights, 28 feet for side lights and 12 feet for the self-starter. The wiring in this car is completely out of sight, and the individual wires are protected at contact points by circular looms which inclose them.

THE FINE PACKARD SYSTEM

Mr. E. F. Roberts, of the Packard factory, has been telling about some of the refinements of manufacture in that plant that call up the excellences of some of our past masters in the horse-drawn vehicle trade that made such names quoted ones. We think vehicle builders will be much interested in some of Mr. Robert's explanations.

"Perfect material is, above all else, the requisite of first importance. Poor workmanship may spoil good material, but no amount of good workmanship can ever redeem poor material."

The inspecting force charged with the important task of detecting faults in material and, later, in workmanship, should be an independent corps, in that it should be entirely uncontrolled by the producing force.

"In spite of this, scores of organizations either through ignorance of their own situation or indifference permit such conditions to remain. It is an emphatic axiom that the average workman thinks of his job first and duty afterward; and an inspector refusing to pass defective work for a foreman who can discharge him is, commercially, an imaginary quantity."

While it is permissable and proper for regular department foremen in the Packard plant to report infractions of discipline on the part of inspectors, with a view to having the proper corrective measures taken, individual inspectors in departments are wholly free from any constraint in criticizing poor workmanship.

"Every operation and every part is passed or rejected absolutely upon its conformity, or lack of it, with the blue print. There are large placards conspicuously posted in every department warning inspectors that immediate discharge will result from passing work on any other basis except written authority of a general executive. Every possible means is thus employed to impress upon the inspectors that their sole responsibility is the maintenance of quality, and that their positions depend upon this and nothing else."

The inspection of raw material, in many cases, is essentially different from that of finished or semi-finished parts, still it all comes under the head of inspection, and many kinds of stock, such as tubing, bar stock for automatic machines and so on, must be gauged to make sure that it is suitable for the purposes for which it is to be used. The work of inspection extends to new dies for forgings, patterns for castings, lumber and body stock, leather, glass, fabric, paints, oils, varnishes and, in fact, every sort of material that enters into the construction of the car.

Checking In a Large Factory

"Factory inspection of parts in process in a large organization can be best conducted almost entirely on a departmental basis," he continues. "In a small plant a central inspection department possesses certain advantages, but with the growth of any business, the time required for trucking and handling must eventually make this method obsolete. In each department a central location should be selected, well lighted and convenient, and here at inspection plates should be installed the head inspector and his assistants. The inspection plates used in the Packard factory are of cast iron, 24 x 57 inches, and of massive and rigid construction. They are planed and finished on top to an accurate surface and carefully used and looked after, being covered every night with a coating of oil and frequently tested for trueness. At these sit the inspectors, provided with blue prints covering every part handled in the room and with standard or special gauges for checking every operation; and to them are brought all the various lots of parts as fast as completed in each operation."

Without the best of gauges the inspection of finished parts would be, of course, impossible, and Roberts pays his respects to the gauge in no uncertain terms.

Micrometers Affected By Heat of the Hand

"The greatest factor in quick and thorough inspection is an efficient system of gauges. There is no more common fallacy in manufacturing than the assumption that a correct set of gauges once issued insures accuracy of workmanship. And a pretty general fallacy is the assumption of correctness for the gauges themselves. Ordinarily the micrometer is accepted as the standard of measurement. When, however, it is remembered that the average micrometer will alter merely by the heat of the hand to an extent of 2/10,000ths, it is obvious that the court of final appeal must be higher.

"I believe there can be no more absolute precision standard than the Johannson system of gauges. A set of these gauges consists of 81 blocks, increasing in size by graduations of 1/10,000ths of an inch. They are manufactured in Sweden, the completion of a single set requiring about five years, and the surfaces when finished being so perfect that atmospheric pressure will hold a dozen of them suspended in a cluster from one held between the fingers in the same manner as though magnetized. In addition to their almost infinite accuracy, they are so impervious to variations of temperature that one of them may be carefully checked in a warm room with the most sensitive instrument possible and then, after being laid on ice, again checked without showing the slightest variation. These gauges may be accepted as the final source of authority on the accuracy of all manufacturing dimensions. They should serve as the check for all master gauges, which, in turn, check the shop sets. Special gauges, of course, must be designed in the tool draughting room as soon as the original design of a new model is issued. Standard gauges, however, are required in such large quantities and the efficiency of any inspection system is so dependent upon their immediate accessibility that standard blanks for snap, plug and ring gauges should be carried in stock at all times. These may be made up rapidly and at low cost principally on automatics, leaving only sizing and finishing operations for the toolmaker, whose duties thus are minimized."

Some Bevel Gear!

As an example of particularly thorough inspection methods, Roberts describes the routine through which a large Packard bevel gear has to pass. The raw steel is given the regular analysis, a material test is made from each lot of rough forgings, rough-machined blanks are checked on the inspection table, the milling machine work is done, and again there is a checking on the table, and a third table checking occurs after the outside diameter and the bevel face has been turned. Then the face of the tooth-plane is ground true and again inspected, and another inspection follows the cutting of the teeth. After heat treating and hardening there is the most important, perhaps, of all tests—that for hardness and strength, the former being tested by means of a sclerescope and the latter by hammer blows applied to the teeth. Still another inspection determines distortion, if any, due to heat treatment.

The gear may now pass on to be finished by grinding, the various stages calling for five more inspections; the final one consists of a special test for smooth action and correctness of tooth bearing, and the result, says Roberts, "is an article as near to the ideal of mechanical perfection as the best of equipment, skill and scientific testing can achieve.

"The routine of gear inspection, while in some respects more complicated than that necessary to follow in the case of minor parts, may nevertheless be noted as typical of the spirit and purpose of a thoroughly efficient inspection. Where such standards are persistently enforced day in and day out, half the object of inspection—that is, the prevention of poor work—is in large part accomplished. The certain knowledge that incompetence or negligence will be infallibly detected and immediately dealt with is the most efficient means of eliminating such faults."

The various inspections of the finished car require experience and good judgment rather than tools, and the road test and the final tuning up call for special experience and aptitude. After this, "there remains only the attaching of any special equipment or accessories and the formal checking out of the car before submitting it to still another inspection, the most

severe and critical of any it has endured. The sales department should have charge of this feature and their attitude should represent as nearly as possible that of the buyer. Not being subject to the control or discipline of the manufacturing department in any degree, they are free to exercise their judgment without fear or favor on every detail of construction, operation and finish. Thier decisions are positive and final and the car that, in their eyes, falls short of the desired perfection is rejected until brought up to this ideal."

GET AFTER THESE CHANCES

F. A. Ives, a former manager of a big horse and carriage mart in New York, in relating his experiences during a tour on business in South America, gives us at first hands an idea of the opportunities that await the carriage and harness makers of this country who are alert to trade chances.

This journal has been at the Department of Commerce for some time without much effect to have its consuls get busy and send us accounts of the trade conditions in vehicles and harness in South America, so we might spread the news, but this account of Mr. Ives is the best eye opener we have yet had the opportunity to print. He says:

"I believe that without any doubt a man could sell 5,000 second hand carriages on the west coast of South America in the next two or three years if the business were properly looked after. My first knowledge of this market came to me from an acquaintance with C. B. Wynn, of Guayaquil, who bought two carriages at Fiss, Doerr & Carroll's during the first year that I had charge of the department, in 1906. He came back each year, and on each succeeding trip took a larger number, until he was shipping fifteen at a time. They were all victorias, cabriolets and landaus. He sold them right on the dock, and not only sold the carriages but sold the boxes in which they were shipped, getting about $25 apiece for them. Before the last lot arrived Mr. Wynn was taken sick and had to come to the United States. I arrived in Colon the day he left there, but went right along just the same.

"When I reached Guayaquil the carriages had not arrived, as they had to go away down around Cape Horn, which means from 70 to 80 days at sea. When the canal is opened you can ship to Guayaquil in 16 days. On account of the danger from disease at Guayaquil I stayed there only three days and went on to Lima, Peru. The carriages reached their destination about a week after I left and were all sold at a big profit.

"Lima is a city of about 100,000 inhabitants, 20 miles inland. You go from the port to the city on an up-to-date electric car. When I got off this car the first thing I saw was a victoria with a number on the back of it, the figures, 974, being about a foot high. I afterward learned this was the license number. There are about 1,200 licensed victorias in Lima.

"I walked the streets for three days before I found a driver who could speak English. Then I took a drive, my idea being to learn who owned these carriages and where they got them, for in my three days of tramping I had not seen one American carriage—not even a Studebaker. They were all built by German, English, French and Austrian makers. I found there were about a dozen liverymen in Lima who owned them all and hired them out, with the horses, for $2 a day to the native drivers. The drivers made good profits, as everybody rides if he only wants to go across the street. Any afternoon you can see the principal streets crowded with victorias filled with ladies and gentlemen, all in their best clothes, out for the daily promenade on wheels. Their principal occupation seemed to be riding.

"When I introduced myself to the liveryman who owned the carriage in which I was riding and told him I was from New York and was there to sell some victorias he said he did not know they built any in the United States. I picked out the best one he had and asked him what he would pay for one as good, free on board in New York. After sparring with him a few minutes I offered to sell him one for $350 in gold. He said he would take 20 at that price. I booked the order and then asked him how much he would give for good second-hand coach harness, most of the harness there being patched up with rope and wire and in a very dilapidated condition. He replied, 'Two hundred consols.' That would be $100 in gold.

"That same afternoon with my English speaking negro as interpreter I took orders for between $20,000 and $25,000 worth of carriages and harness. Every liveryman I visited and showed my pictures gave me an order. Some of them had heard of the Fiss, Doerr & Carroll Horse Co., but never had seen an American carriage. On looking up the responsibility of my customers I found that some were good and some were bad. However, I sent down about 30 victorias and cabriolets and with each one sent a set of double harness. On these we made profits ranging from $100 to $250 and $50 on the harness. Mr. Carroll thought so well of the markets I discovered that he kept it all quiet and was preparing to go extensively into the export business when he was taken sick and died. With a central distributing house in Panama and others in Guayaquil, Lima and Concepcion a lot of profitable business might be done not only in carriages but in all American goods. The business now is in the hands of the Japs, Germans and English."

In speaking of the quarantine of Guayaquil Mr. Ives described conditions there as being almost unbelievable when he visited Ecuador.

"The filth in the river and harbor there was something astounding. The captain of the steamship California, of the Pacific Steam Navigation Co., told me they used to send their vessels home to England every two years to have the bottoms scraped and cleaned, but he found that two days in the river at Guayaquil would accomplish the same purpose. I saw rats swollen to twice their natural size with bubonic plague on the streets of Guayaquil, and I paid $5 a day for a room in the best hotel which hadn't any more sanitary conveniences than a log stable. The place was literally alive with vermin. There was no running water in the city, and the only sewers were the open gutters. If they don't clean up that country before the canal is opened you will see the bubonic plague, yellow fever and smallpox brought into our ports as sure as the ships go and come, in my opinion."

KING ALFONSO OWNS THE FINEST STABLE

Paradoxical as it may appear, the finest stable in Europe belongs to one of the keenest motorists on the Continent, says the London Telegraph. King Alfonso is, however, an all-round sportsman, and has ridden since he was old enough to bestride a pony; while the state pageants of Spain are (so far as horses and carriages are concerned) unique. The Spaniard has always been a lover of good horses (those sacrificed in the bull-ring, are merely living cat's meat); the shocking roads of the Peninsula still making riding often preferable to driving in many parts.

Anyone can visit the Royal Mews with proper permission, and they are one of the sights of Madrid that no intelligent tourist misses.

"It is not a stable, but a town," said my guide. "I was born here, and so were all these," pointing to some 50 youngsters running about the innumerable courtyards.

A guide is not so much a luxury as a necessity to the stranger in this maze of corridors and courts, staircases and stables.

The great attraction is the state coach house, where ten state and ten semi-state vehicles make up a show unequaled in the world. One huge black mourning coach is said to date from Queen Elizabeth's time, but most are, like the British royal coaches, from 100 to 150 years old. Each has a name well known to every Madrilene street boy, alluding to some special feature of the vehicle: the "Mahogany," "Shell," "Ducal Crown," "Monogram" or "Gilt-paneled coach. The brand new hammer-cloth of this, the finest of them all, dates from the King's wedding day. The bomb which killed so many harmless sightseers and soldiers riddled the coachman's seat so

severely that a new one had to be provided. Protected by the footboard, the driver was not actually killed, but he died within the twelve-month. The blood-stained wig of one of the footmen, killed on the spot, and the harness of the two horses (one of which fell dead, the other being mortally injured) are still preserved, and sometimes shown to special visitors.

The ordinary coach house contains about 150 carriages, of which half are now motors. The horse vehicles are of every imaginable kind, from the donkey carriage of the baby princes to the hearse in which deceased royalties are conveyed to the Escurial. In this mail coach the royal family attend the races, in that landau the theatre, and in this other open carriage the bull ring. The finest show of horse flesh now visible in Europe is the return from the first bull fight on Easter Sunday, when the motor is tabooed by all the best people, and the prettiest mantillas and the smartest turnout form a close-packed procession many miles in length and well worth seeing.

The harness room, 130 yards long by 52 feet wide, is a museum of which the tourist never tires. Here are relics of the time when Queen Mary of England was the wife of the reigning King of Spain, rich oriental saddles and trappings offered by Moorish and Turkish sultans, the King's personal saddlery and uniforms ever since childhood, liveries for postilions and outriders, for kettle drummers and trumpeters, equerries and lackeys; the famous "yellow guard" costumes, dating from the days when King Charles of England visited Madrid; the lances with which officers and nobles fight bulls in the arena during the coronation fetes. The huge plumes of the state coach horses, the black "mourning" harness, picadors' costumes and saddlery—all the picturesque past and present of pageantry in Spain is evoked by this huge and curious collection.

The great stable is the same size as the harness room above, and accommodates nearly 150 horses, probably the largest building of its kind (for carriage and riding horses) in the universe. Refitted at the time of the royal marriage, it is distinctly up to date, with yellow "clinker" pavement, tiled walls, iron stall divisions and enameled manger troughs. Fifty polo ponies are lodged apart—a little metal basket, in which royal visitors or officials can offer carrots, etc., to the horses will be noticed, and tiny ponies and donkeys for the infantes and infantas are lodged in suitably microscopic boxes.

FOR TRADE PRESS EFFICIENCY

Sixty Speakers of National Reputation on the Federation Convention Programme

President H. M. Swetland, of the Federation of Trade Press Associations in the United States, announces that the programme has been completed for the Eighth Annual Convention at the Hotel Astor, New York, September 18 to 20.

Acceptances are in hand from over 60 speakers of national reputation in the manufacturing, selling, advertising and publishing fields. There will be 50 ten minute addresses at the editorial, circulation, advertising and publishing symposiums on vital questions affecting all those who have dealings with the business press of America.

Other features of the convention will be an exhibit of successful class, technical and trade journal advertising campaigns, a big business meeting at which will be told the inside stories of the big trade paper publishing successes and an inspirational mass meeting with addresses by representative business and professional men on subjects of live interest to editors, publishers and advertisers.

All the regular sessions of the convention will be open but tickets must be secured for the inspirational mass meeting. These may be obtained from any member of the Federation or from W. H. Ukers, chairman of the committee on arrangements, 75 Wall street, New York.

J. N. GUNN RELINQUISHES STUDEBAKER MANAGEMENT

Having accomplished the purposes he had in view, J. N. Gunn, general manager of the Studebaker Corporation, tendered his resignation at a meeting of the directors held in New York recently. It was accepted but, at the solicitation of the directors, Gunn will remain a member of the board.

The vacancy created by Gunn's resignation was filled by the promotion of Clarence H. Booth, former assistant general manager, who thereby becomes head of the Studebaker automobile division. Booth has been connected with the Studebaker establishment for many years and has served in so many departments that he is familiar with the entire structure.

Gunn was elected a director and general manager of the entire Studebaker Corporation in April of last year, at about the time Walter E. Flanders was preparing to relinquish the management of the automobile division and when his preparations had caused an interesting if not delicate situation.

Gunn is a member of Gunn, Richards & Co., who are efficiency engineers and accountants, and, although he previously had performed special work for the Studebaker Corporation, his entry into it as general manager was wholly unforeshadowed and wholly unexpected.

COLUMBUS BUGGY CO.'S PROSPECTS

Operation of the Columbus Buggy Co. by the managing committee of the creditors is producing the most gratifying results, according to T. C. Dunlap, who is actively in charge of the business. The management is aggressively extending its efforts in the selling branch of the business with marked success. While continuing to foster the business created in more distant parts of the country, those in charge of the company now are seeking to build up a greater selling organization in the central states, with especial efforts toward the establishment of the company's electrics and gasoline automobiles in Ohio. That this course is meeting with good results is attested by the volume of orders for cars being received. The plants are being operated at a fairly good percentage of capacity and have orders booked for deliveries considerably in the future.

STATES GET A THIRD OF FOREST SERVICE RECEIPTS

A circular just issued by the forest service calls attention to the various laws under which more than a third of all national forest receipts go to the benefit of the states in which the forests are situated, for schools and roads. In 1912 the amount of money thus made available for state purposes totaled about $750,000. The report does not show the amounts due from the receipts of the fiscal year which closed June 30, 1913. Including these, the states' share of national forest funds since the laws were passed has aggregated over $3,000,000.

These facts are set forth, according to the forest service, because a popular impression still exists that all money received by the government from timber sales, grazing fees, water power permits, etc., is permanently taken out of the states where it is paid and goes into the national treasury to meet the general expenses of the government. This idea is said to prevail, to some extent, even among actual forest users in the national forest states, where the division of receipts with the states has been going on for years.

TWO LUBRICATING ANECDOTES

While connected with an automobile manufacturing company a few "lubricating" problems came to my notice which were very amusing. One shows the carelessness of some manufacturers, and the other shows the ignorance of some buyers.

In "breaking in" a new car, it was customary with us to

flood the cylinders with oil. This was accomplished by adding about an extra gallon of oil in the crank case. A boy looked after the oiling up, and other minor details, before the cars were handed over to the testers.

One day a tester had gone a very short distance with a new car when it stopped. He worked with it for some time but could not get it to start; in fact, he could not even "turn her over."

The car was towed back to the factory, and torn down. It did not take us long to see what had caused the peculiar actions. The boy had drawn his "lubricating oil" out of a barrel of shellac which was stored in the oil house.

Another amusing experience followed the sale of a car to an upstate Dutchman. Very soon after he had received it we received a letter asking us to send a man up to his place "to make the thing go."

Our man got the motor started, but it moaned and groaned frightfully. It was very apparent that the car had not been oiled, not even the cylinders.

Our man asked the Dutchman if he had oiled the car, and received the answer, "Nein."

"Well, why didn't you?" inquired the service man.

"Vell, don'dt der pook (meaning the catalog) say der plamed ting iss self-oiling? Vy should I oil him? Ain't he oiling himself?"

LONG SERVICE

George, Yule, president of the Bain Wagon Co., Kenosha, Wis., celebrated his 71st year as a wagon maker, July 1. Mr. Yule, in 1842, then 18 years old, started to work for Mitchell & Quarles, at Kenosha. In 1852, Edward Bain purchased the Mitchell & Quarles business and retained Mr. Yule as superintendent, which position he held for many years. In that work he had direct charge of the manufacturing end of the business and is largely entitled to the credit for the high reputation attained by the Bain wagon.

After Mr. Bain's death, Mr. Yule was elected president. While he is nearly 89 years old, he keeps in close touch with the business and there is seldom a day when he is not in his office. Mr. Yule received congratulations from his many friends in honor of his 71st anniversary as a wagon maker and his connection with one company for 71 years.

WHAT NEXT IN REFINEMENT OF DETAILS?

"Refinement of details" has come to mean many things in many places but that it has real meaning in some places there is ample evidence. When the effort is made, there seems no limit to what the refining hand can do in adding comfort and conveniences to a car.

Electric illumination of the instrument board and of the running boards is not new, and is rightly considered a detail improvement; but now comes a manufacturer who carries the refinement further by putting several little lamps on the instrument board so that not only all the dials are illuminated, but also the levers and the floor boards. And going still further, lenses are placed in the side lamps so that at all times a bright beam of light is thrown on each of the running boards, with a similar lens in the tail lamp throws light on the gasoline gauge.

BRISCOE CAR NEARLY READY

Benjamin Briscoe, former head of the United States Motor Co., arrived in New York early in July and visited several points, some of which were the scenes of former Maxwell-Briscoe activities. He returned to Paris on July 26. While Briscoe has organized the Briscoe Bros. Co., under French laws, and at a plant in Billancourt, near Paris, has been developing a light car for the American market, it was generally believed that it was his immediate intention to form an American company for its actual manufacture. It transpires, however, that this is by no means assured; instead, it is not improbable that the actual production of the Briscoe car in America will be turned over to others.

Although it was not understood to be included in his plans, it is fairly well settled that the Briscoe Bros. Co. will make an active bid for European trade in 1914, and that the car will first be publicly exhibited at the forthcoming Paris show in October. Several of them already are on the roads around Paris and, according to reports, are giving an uncommonly good account of themselves.

In its design, the Briscoe car does not depart radically from standard practice. It embodies all of the latest ideas of the French school, but has been laid out with a view of economical production on an American quantity basis.

HIDES FOR TRIMMING

In selecting and buying hides it is necessary to bear in mind and distinguish between "quality" and "selection." There are best and second quality, and there are best and second selection.

Quality refers to the natural grain and texture of a hide, whereas selection refers to its freedom, or otherwise, from holes and cuts, good or bad shape, or other defects. Therefore we may have a hide which is best quality and best selection, or a second quality, best selection, and so on.

A hide which is of good texture throughout will be found to take the graining cleanly and evenly all over, while an inferior one is soft and flabby at the flanks, and takes the grain badly at these parts. The latter cannot, of course, cut out to such advantage as the former—there is more waste, and this must materially affect its price.

NEW SOURCE OF RUBBER

A company has been formed for the cultivation of the rubber vine Cryptostegia Grandiflora in the Bahamas. The plant grows as a vine and after six months' growth it is from 12 to 30 feet long. Five thousand vines will be planted to the acre and the first cutting will take place at the end of twelve months. Each vine will yield about two pounds of cutting containing in the neighborhood of two per cent. of rubber so that the yield will amount to 200 pounds of rubber to the acre. The rubber is of good quality and sells for only about eight cents under the price paid for the best Para product. The bark of the vine yields a cellulose fiber while the pods contain a large amount of silky cotton suitable for stuffing pillows or even for making cotton thread. It yields a better product than the gayule shrub of Mexico; the yield is heavier and it stands cultivation much better. The only hindrance, it is said, to the cultivation of the rubber plant in the Bahamas is the scarcity of labor.

FRANKLIN ALSO TO DISCONTINUE "FOURS"

Joining the increasing number of manufacturers who have taken similar action, the H. H. Franklin Mfg. Co., of Syracuse, N. Y., has discontinued the manufacture of four-cylinder cars and will concentrate its efforts entirely on the production of "sixes." First reports stated that only the Franklin "little six" would be continued, but such is not the case, as both the so-called "little" and "big" ones will be produced exactly as heretofore.

LOW-PRICED ELECTRIC

Long expected, the under-$1,000 light electric car is at last in a fair way of becoming available. Backed by Chicago capital, Carl Probst, of Toledo, O., is the man who has performed the development work, his first car having made its appearance on the streets of Toledo.

Trade News From Near and Far

BUSINESS CHANGES

Kingfield & Heit have purchased the business of D. Gilbert, in Ionia, Ia.

W. A. Price has purchased the business of A. C. Goltz, in Laurel, Neb.

A. R. Dean has purchased the business of Brady & Rodgers, in Blue Rapids, Kas.

George Baird has purchased the business of E. D. Baker in Gann Valley, S. D.

Wm. Flerbeck has been succeeded in business in Ellis, Neb., by Langworthy & Foster.

J. H. Jordan has purchased the implement business of Fred W. Kroeger, in Saco, Mont.

W. H. Enslow & Son have purchased the wagon business of S. S. Crawford, in Holt, Mo.

W. J. Meade has purchased the entire business of the J. F. Schutts Co., in Pe Ell, Wash.

Severson & Nysteun have succeeded to the business of Hans Severson, in Northfield, Minn.

Meier & Son are about to move their vehicle stock in Carrollton, Mo., to a new location.

C. F. Haigler has purchased the stock of buggies, etc., of Frank Spangler, in Strand, Neb.

Albert Johnson has purchased the stock of vehicles, etc., of Runck & Co., in Kathryn, N. D.

Reinholdt Bros. have disposed of their stock of buggies, etc., in Sawyer, N. D., to O. K. Jensen.

W. H. Green has disposed of his stock of vehicles and implements in Creighton, Neb., to A. J. Roe.

Dunford & Knudson have succeeded to the stock of buggies, etc., of Wm. McGee, in Canton, Minn.

H. W. Zickrick has disposed of his implement and vehicle business in Howard, S. D., to H. M. Hanson.

J. F. Ollinger has succeeded to the entire business of the Ollinger-Hollinger Motor Co., in Winfield, Kas.

W. E. Rossman has disposed of his stock of carriages, etc., in Washington, Kas., to Connet & Hill, of Axtell, Kas.

NEW FIRMS AND INCORPORATIONS

The Standard Vehicle Co. has opened for business in Springfield, Mo.

A. Morinini has opened up a new stock of buggies, etc., in Stratford, Cal.

Theodore Guthrie has opened a stock of vehicles, etc., in Syracuse, Neb.

Louis Greenberg has opened a new stock of vehicles, etc., in Van Nuys, Cal.

J. A. Christensen has added a line of buggies to his store in Enumclaw, Wash.

E. Robinson is about to open a new stock of hardware, vehicles, etc., in Lushton, Neb.

A. R. Patton is opening a new stock of vehicles and implements in Blue Springs, Neb.

R. D. Stratton, of Texoma, Okla., has opened a new stock of buggies, etc., in Elkhart, Okla.

Bert Hawn has just established himself in the vehicle and implement business in Russel, N. D.

The Washington Buggy Co. has been incorporated in Washington, N. C., with a capital stock of $300,000.

The Pretlow Buggy Co. has been organized in Franklin, Va., by J. A. and R. A. Pretlow and M. H. Moore.

Henry Sweeter has been succeeded in the buggy and implement business in Monroe, S. D., by Andrew Miller.

The town of Washington, N. C., is soon to have a $30,000 buggy and wagon factory, the Washington Buggy Co. having been incorporated with that amount of capital.

The Schneider-McCullough Carriage Co., Indianapolis, $3,000, has been incorporated to deal in carriages and automobiles by P. Schneider, M. R. Schneider, L. R. McCullough.

Gus Swartz, who has been foreman of the wagon making department at the Keystone Driller Works at Beaver Falls, Pa., for a number of years, has resigned his position and will erect a shop at the corner of Twenty-third street and Seventh avenue and will commence business for himself, September 1.

IMPROVEMENTS AND EXTENSIONS

The Ravenwood Auto & Buggy Co., of Ravenwood, Mo., has added a new garage to its plant.

The Flannagan Buggy Co., of Greenville, N. C., is adding a $15,000 building with all of the necessary machinery to its already large plant.

The Hackney Wagon Co., of Wilson, N. C., amends its charter so as to provide for increase of capital stock from $100,000 to $200,000. W. D. Hackney is president of the company.

The Allen Motor Car Co. will erect a large addition to its plant at Fostoria, O. The two-story frame building at the rear of the main building will be removed and the entire space will be covered by a one-story brick and concrete building 98 x 198 feet.

Land has been leased in Clarksville, Tex., by the Gibbons Mfg. Co. for the erection of their factory. This company will manufacture wagon beds, seats, wheelbarrows and other articles. The amount invested in the new enterprise will be approximately $15,000.

George T. Noble and Joseph P. Biedermann, of the Chicago Carriage and Trimming Co., have purchased the property at 3514-20 Michigan avenue, 83 1/3 x 197 feet. Consideration nominal, but said to be $40,000. The purchasing company, now located at 1908-12 Indiana avenue, will improve with a four-story building covering the lot, to cost about $85,000. The company, which is one of the oldest automobile body building, painting and trimming concerns in Chicago, will occupy the building with their own business. The building will be completed about December 1.

The Velie Carriage Co., Moline, Ill., will put up a $40,000 addition to its plant. It will add two stories to the transfer building, which runs parallel to Third avenue and which is the third building north of the thoroughfare in the Velie group of buildings. This structure at present has ground dimensions 100 x 300 and is four stories high. The two additional stories will increase the floor space by 50 per cent. and is made necessary because of the constant growth of the concern and by reason of increased demand for the Velie product. The two additional stories will be of brick and mill construction to correspond with the present building, and will be equipped with necessary elevator shafts, fire doors, etc.

NEWS OF THE AUTOMOBILE TRADE

J. E. Weber is a new automobile dealer of Hugoton, Kas.

R. S. Smith is about to open in the automobile business in Marshall, Tex.

J. B. Levy is reported about to establish a racing car factory in Tulsa, Okla.

The Hannibal Wagon Co., of Hannibal, Mo., has just added a line of automobiles.

T. D. Kemp has purchased the business of the Auto Supply Co., in Wharton, Tex.

W. C. Brown has succeeded to the business of the Beloit Auto Co., in Beloit, Kas.

John Jolly has sold out his automobile business in Great Bend, Kas., to Roy Shady.

The Ford Automobile Co., of Detroit, is establishing an assembly plant in Houston, Tex.

The Alma Motor Truck Co. has been incorporated in Alma, Mich., with a capital stock of $50,000.

The Garland Auto Co. has been incorporated in Hot Springs, Ark., with a capital stock of $10,000.

The John Berry Automobile Co. has been incorporated in St. Louis, Mo., with a capital of $20,000.

The Weber Motor Car Co. has been incorporated in St. Louis, Mo., with a capital stock of $2,000.

The G. M. Automobile Co. has been incorporated in St. Louis, Mo., with a capital stock of $5,000.

The Morris Motor Co. has been incorporated in Thomasville, N. C., with a capital stock of $40,000.

The Wood Auto & Machine Co. has been incorporated in Carrollton, Ky., with a capital stock of $10,000.

The Tecumseh Automobile Co. has opened for business in Tecumseh, Neb., with E. H. Grist as manager.

Robert May, formerly of Enid, has become assistant manager of the Overland Auto Co., in Wichita, Kas.

Fred West, of Larned, Kas., has been made manager of the Turon Motor & Implement Co., in Turon, Kas.

The Seitz Automobile & Transmission Co., of Monroe, Mich., has been succeeded by the Detroit-Wyandotte Motor Co.

The Larson Auto Co. has been incorporated in Fremont, Neb., by Luther C. Larson and others, with a capital of $5,000.

The Rock Hill Buggy Co., of Rock Hill, Va., is about to experiment on automobiles and may begin their manufacture.

The Day Automobile Co., of Detroit, is reported about to open up a branch factory in Millwood, Wash., a suburb of Spokane.

FIRES

The stock of buggies, etc., of C. E. Krause, in Elk Point, S. D., has been destroyed by fire.

The stock of vehicles, etc., of P. O. Beaulier, in Winner, S. D., has been destroyed by fire.

The plant of the Des Moines Carriage Co., of Des Moines, Ia., has been damaged by fire to the extent of $50,000.

TRAVELER'S NOTES—PENNSYLVANIA

Reading

This enterprising city is making rapid strides and is bound to make its influence felt. There is a considerable carriage, wagon and harness business done here. Pennsylvania always was strong in the manufacture of horse-drawn vehicles, supplies and various parts.

The Keystone Vehicle Co. is one of the large firms of the city, and is very busy. Sold out to their full capacity till after October first. Now taking orders ahead for 1914. Has 285 men at work making 4,200 pleasure cars, 1,700 commercial cars and 2,000 horse-drawn wagons a year. A great many metal bodies are being turned out for wagons, while for the automobiles, all metal bodies are being used. Has put in a $15,000 sprinkler system. The company ships regularly an average of 50 new wagons a month for one large order. In the sheds are carried 220,000 feet of lumber. The top floor of the factory is for the making of wagons. This concern has the largest body plant in the east. Every coat of paint put on is baked in the oven; it dries that way in two hours. There are 17 fires in the blacksmith shop, and no helpers are at work, as power furnishes the air to make the heat. H. John Herb is the president of the company; H. P. Burmeister, general manager; F. Burmeister, superintendent.

George D. Lessig, in the farm implement line, is handling the Eagle and Schwab wagons.

George J. Zellers, who was foreman for the Himmelberger plant, has bought the property at 35 Popular street and started in business painting and trimming automobiles.

F. R. Himmelberger's wagon plant was bruned out a short time ago and he is now with his brother at West Reading.

Wetherhold Bros. failed some time ago at 35 Poplar street. W. W. Wetherhold has now started in business at same address; has quite a lot of new work and repairs on hand, and expects to do well. He will build a one-story iron building, 42 x 37 feet in size, in the rear of the plant, for a blacksmith and wood working shop.

The Anchor Bending Works, J. A. Lippe's Sons, are making the same lines that they did in 1859. There is no wood to take the place of hickory, they say. Have been working full time for years and have all they can do for the wholesale and export line. Have two mills in Michigan and enough timber in Arkansas and Louisiana to last for two years.

Biehl's carriage and wagon works, at 31 South Fifth street, is very busy, but help is short. Can sell more than they can turn out of buggies, business wagons and automobiles. Owing to high price of lumber price of the work turned out has been raised 25 per cent. There has been lately a raise on ash of 20 per cent., and also higher prices on poplar and other hard woods.

Strohecker's carriage works expect to get out of this line and go into the automobile trade.

The E. S. Youse Co., of 144 Rose street, is repairing automobile bodies and figuring on some truck work. Expect later to build a large factory when the proper location is found.

RAUCH & LANG UNDERTAKE ENLARGEMENT

The Rauch & Lang Carriage Co., makers of the R. & L. electric, have commenced work on the enlargement of their factory in Cleveland. The addition will be a brick and steel structure, 112 x 199 feet, which will afford 78,000 square feet of additional floor space.

GOODYEAR DEVELOPS TIRE FOR ELECTRICS

The Goodyear Power Saver pneumatic tire is the style of a new tire which just has been placed on the market by the Goodyear Tire & Rubber Co., of Akron, O. It is designed especially for use on electric cars and is a moulded tire of lighter construction than the older models.

FLANDERS ELECTRIC CHANGE

What was the Flanders electric car is about to become the Tiffany Mignon, made by the Tiffany Electric Car Co., the Flanders machinery and stock having been purchased by E. LeRoy Pelletier and several associates, who have organized the Tiffany Company to continue its manufacture under the new name. In addition there will also be made a larger and more expensive car—one in the $3,000 class—which will be styled the Tiffany DeLuxe.

NEW TRI-STATE DIRECTORIES

P. T. Rathbun, secretary of the Tri-State Vehicle and Implement Dealers' Association, Springfield, O., has issued new directories of vehicle and implement dealers in Ohio, Indiana and Kentucky. Unusual care has been exercised to make this complete, that is, to show all the regular dealers in these lines. The Ohio and Indiana directories are sold at $2.50 each, and the Kentucky directory for $1.50.

OBITUARY

Samuel Dean, 73, a retired carriage manufacturer of Brooklyn, N. Y., for 50 years, died July 5 at his home, 2252 Church avenue, of a complication of diseases. Mr. Dean was a veteran of the civil war and is survived by his wife, two sons and a daughter.

Will Davis, associated with his father, David Davis, until the latter's death, in the carriage making business at Marion, Ind., died July 4 from cerebral hemmorrhage. Born at Newcastle, Ind., September 1, 1858, the deceased moved to Marion with his father before the close of the war, 1864, it is believed. His father established a carriage shop on the south bank of the Mississinewa River on what is now Washington street. It was then an Indian trail. Will Davis was associated with his father in the business from the time the shop was established until the death of David Davis. During all these years the business was conducted on the same site.

Luke Brannin, 84, for many years employed as a carriage builder in some of the leading factories of New Jersey, died July 19 at Manasquan, N. J., of Bright's disease.

James Daniel, pioneer carriage builder of Paterson, N. J., died July 19. He was in his 86th year and his death was due to the infirmities attendant upon old age. He is survived by two sons and one daughter.

Frank W. Joubert, 51, a member of the well known carriage manufacturing firm of Joubert & White, Glens Falls, N. Y., died July 12. He had been in ill health during the past two years. His wife and one son survive.

James F. Romler, 56, for 35 years in the wagon making business at Armor, N. Y., died July 11 from blood poisoning, from a bruise received on the 4th of July. His wife, three sons and four daughters survive.

Charles Will, 44, well known wagon manufacturer of New Orleans, La., died July 24. He had been sick but a short time, having suffered a paralytic stroke three weeks previous.

Patrick B. Hynes, 72, pioneer buggy manufacturer of Quincy, Ill., died at the home of his daughter, Mrs. Olive Barrows, in Sheboygan, Wis., on July 28. He was born in County Clare, Ireland, and came to this country with his parents when a child of three years. The family settled in Ohio and Patrick grew to manhood there, learning the trade of a carriage maker and more especially of a carriage painter. He engaged in the manufacture of vehicles in Springfield, O., for two years prior to moving to Quincy in 1871, and on arriving there formed a co-partnership and operated a factory under the firm name of Hynes & Moon. Subsequently the name was changed to the Hynes Carriage Co. and afterwards to the Hynes Buggy Co. Since the business was started in Quincy, in 1871, Mr. Hynes had personally supervised the mechanical part of his carriage and buggy factory until his failing health made this impossible, and then, on June 3 last, he gave up his work and went to Wisconsin. His widow and five children survive.

T. Joseph Keeler, of Rochester, N. Y., a prominent man in carriage manufacturing, died on July 16 at the age of 69 years. He was a principal owner in the firm of Keeler & Co., previously Keeler & Jennings, which was a large producer of carriages and hearses. Mr. Keeler leave a wife and five daughters.

DEMAND FOR MOTOR LORRIES IN CEYLON

Consul Henry D. Baker writes that owing to heavy mortality among the bullocks used for transporting plantation products in Ceylon, due to rinderpest and foot-and-mouth disease, a revolution seems to be impending in the mode of transportation in this island, in the substitution of motor lorries for the picturesque but slow and cumbersome bullock carts which for centuries have been the chief means of conveying goods in Ceylon. Up to the present, government regulations in regard to the use of motor lorries on the roads of the island have been so severe and restrictive as practically to prevent their use, but owing to the extreme necessities of the present situation the government seems now prepared to relax these regulations and also to embark on a comprehensive policy of widening roads and building stronger bridges for the express purpose of making it safe to abandon bullock carts in favor of motor lorries.

PARCELS POST MOVES

Beginning with this publication date (July 1) the government inaugurates its C. O. D. feature in connection with parcel post. The innovation in merchandise carrying has now been in force for six months, and during that time there has been no general complaint from the retail dealers that their business has been injured in the least. On the other hand a good many dealers declare that they have been benefited by parcel post and the manner in which they have put it to practical use. —Farm Machinery.

A reference to the files of this energetic publication anterior to the passage of the parcel post law, with the above in view as a text, would furnish an interesting commentary on editorial wisdom. In picking this journal no invidious example is sought, the whole bunch had slipped their trolleys on the subject. Hysteria is a disease, not an argument.

$10,000 BUILDING FOR N. I. AND V. SHOW

At a meeting of the board of directors of the National Implement and Vehicle show it was decided to build a new exposition building to cost approximately $10,000, at Peoria. The new structure will be located near the amphitheatre, with an annex facing the grand stand. Secretary W. O. Ireland and Superintendent Richard Waugh were authorized to rush the work of construction. The building will be 180 feet in length and 38 feet wide, containing about 50 booths for exhibitions. The firms that occupied this space last year in tents will be found in the new structure.

ANOTHER BUILDING FOR DIAMOND CHAIN

The Diamond Chain & Mfg. Co., of Indianapolis, has bought what is known as the Holliday & Wyon building at Ohio and West streets in that city, and will utilize it as an annex to its plant on South Senate avenue. The building acquired is a three-story brick and concrete structure, 66 x 145 feet.

AKRON RUBBER NEWS

The Firestone Tire and Rubber Co., which only recently took possession of a new addition to its already extensive plant, has started work on another new structure, a building permit having been granted for a four-story brick and steel factory building, to cost $90,000. The Firestone plant, which now covers fifteen acres and gives employment to more than 3,000 persons, is said to be the largest plant in the world devoting its energies exclusively to the manufacture of tires, the daily output of its finished product having been stated by a director of the company to be 50 tons. This enormous business was started about 15 years ago, when H. S. Firestone, president of the company, commenced operations in a small way at Miller and Sweitzer streets, manufacturing "The Firestone Side-Wire Carriage Tire."

The Goodrich Company, which recently paid a semi-annual tax of $96,400, is the largest taxpayer in the city of Akron.

C. S. Thompson, formerly advertising manager of the Diamond Rubber Co., and since its consolidation with the B. F. Goodrich Co., connected with that concern, has resigned, Mr. Tibbets now having full charge of the advertising department.

All Akron rubber factories are running day and night and are still unable to fill all their orders.

NEW WHOLESALE HOUSE AT SPRINGFIELD, MO.

A new wholesale vehicle house began business in Springfield, Mo., on July 1 under the name of the Standard Vehicle Co.

The firm is composed of Robert A. Bowland and L. O. Lovan. Bowland completed an eight-year term as county treasurer last January. He will be office manager. Lovan was formerly occupied in the jobbing business in the harness line in Springfield. He will spend the greater part of his time on the road as salesman.

The articles of incorporation state that the firm will sell at wholesale vehicles of all kinds, farming implements and repairs, and harness, conducting a general jobbing business in these lines. The company expects to add automobiles within a short time.

TO SETTLE AT 25 CENTS ON THE DOLLAR

At a meeting of the creditors of the J. B. Judkins Co., of Merrimac, Mass., in the federal court in Salem, and which was largely attended, it was voted to accept the formal offer of the company to settle their liabilities on the basis of 25 cents on the dollar. The action of the creditors will have to be approved by Judge Morton of the federal court, but this is looked upon merely as a legal formality.

BUGGY PLANT FOR RICHMOND, VA.

The Richmond (Va.) Buggy Mfg. Co. has been incorporated with a capital of $100,000, and the company can own 1,000 acres of land. The officers are: John B. Pender, president, and T. M. Carrington, Jr., secretary-treasurer.

The new company will erect a large factory on the south side of the river, fronting on the tracks of the Atlantic Coast Line, and expects to be in operation in a few months.

WANTS

Help and situation wanted advertisements, 1 cent a word; all other advertisements in this department, 5 cents a word; initials and figures count as words. Minimum price, 30 cents for each advertisement.

PATENTS

Patents—H. W. T. Jenner, patent attorney and mechanical expert, 606 F St., Washington, D. C. Established 1883. I make a free examination and report if a patent can be had and exactly what it will cost. Send for circular.

SITUATIONS WANTED

Situation Wanted—Carriage painted striper and finisher; can take charge; prefers job in small town in custom shop. Painter, Box 144, Jamestown, Ohio.

Young man with several years experience as trim foreman and assistant superintendent with largest buggy and surrey manufacturing establishment in the country, would like to correspond with company in need of superintendent who is a producer. Address Box 27, care The Hub.

BUSINESS OPPORTUNITY

I have an opportunity to obtain control of centrally located carriage factory with long established trade and a continuous money maker. Need a first class active sales or production man or one who is both to complete the organization. Liberal salary and interest to the man who can qualify. Unquestioned references furnished and expected. A brief outline of what you have done and can do, without revealing your identity if you wish, will lead to further correspondence and interview. Address B. E. A., care this paper.

TRAVELING SALESMAN

Wanted—Traveling salesman to sell anti-friction axles to the wagon and carriage trade. Must have had large experience, good sales record, and acquaintanceship in same line. None other considered. State experience, territory covered, class of trade called on, age, and salary expected. Address, The Timken Roller Bearing Co., Canton, Ohio.

MOTOR TRUCK COMPANY'S ASSETS BELOW LIABILITIES

According to the schedule filed with Referee in Bankruptcy Wicks, the liabilities of the Grand Rapids (Mich.) Motor Truck Co. are $124,239.74 and the assets are $110,006.81.

Frank T. Hulswit and the Old National Bank are the heaviest creditors. Hulswit is a creditor to the extent of $31,694 and the bank a creditor to the extent of $38,990.

FIRESTONE AND FAMILY IN EUROPE

H. S. Firestone, president of the Firestone Tire & Rubber Co., has joined the increasing number of automobile tradesmen who are "doing" Europe. He is accompanied by his family and will motor through France and Italy, and possibly Switzerland and Germany. He will return to Akron about September 1.

INDEX TO ADVERTISERS

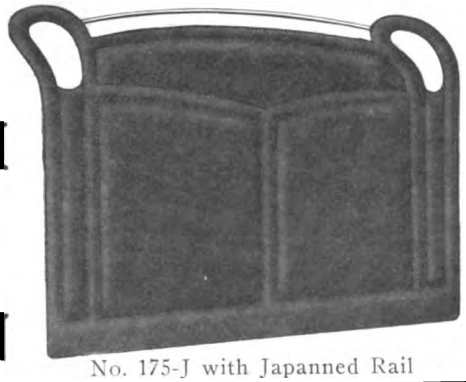
BUSY BUYERS BRIEFS

McKINNON DASH COMPANY

BUFFALO, N. Y.

TROY, OHIO ST. CATHARINES,
CINCINNATI, OHIO ONTARIO

Try Our No. 175 J. DASH For Your 1914 ROAD WAGON



No. 175-J with Japanned Rail

Remember to Call for

JAPANNED RAIL PADDED DASHES

For All Vehicles

"BLACK VELVET" CUSHION SPRINGS

Manufactured Only by the

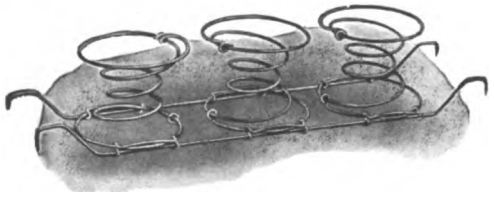
NATIONAL SPRING AND WIRE COMPANY

ALBION, MICH. WINDSOR, ONT.

THE SPRING OF QUALITY.

SPRING or SOFT EDGE CUSHION FRAME

For Buggies or Other Vehicles. Built of the Highest Grade of Steel Wire.



STRIP FOR WOOD OR BOX FRAME

WILLEY'S COLORS

The RECOGNIZED STANDARD

C. A. WILLEY CO.

COLOR GRINDERS

and Manufacturers of Specialties in

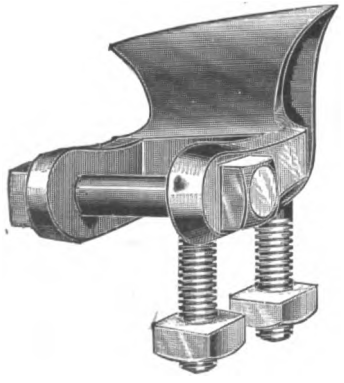
CARRIAGE, AUTOMOBILE AND CAR

PAINTS

COLORS, VARNISHES, ETC.

HUNTER'S POINT, NEW YORK CITY

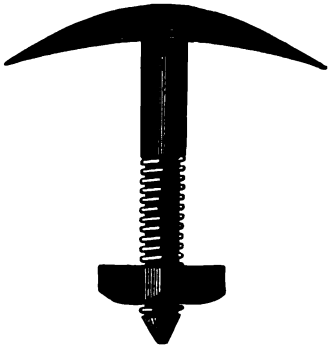
Skewed Shaft Couplings



Regular or Oval Patterns For High Arched Axles

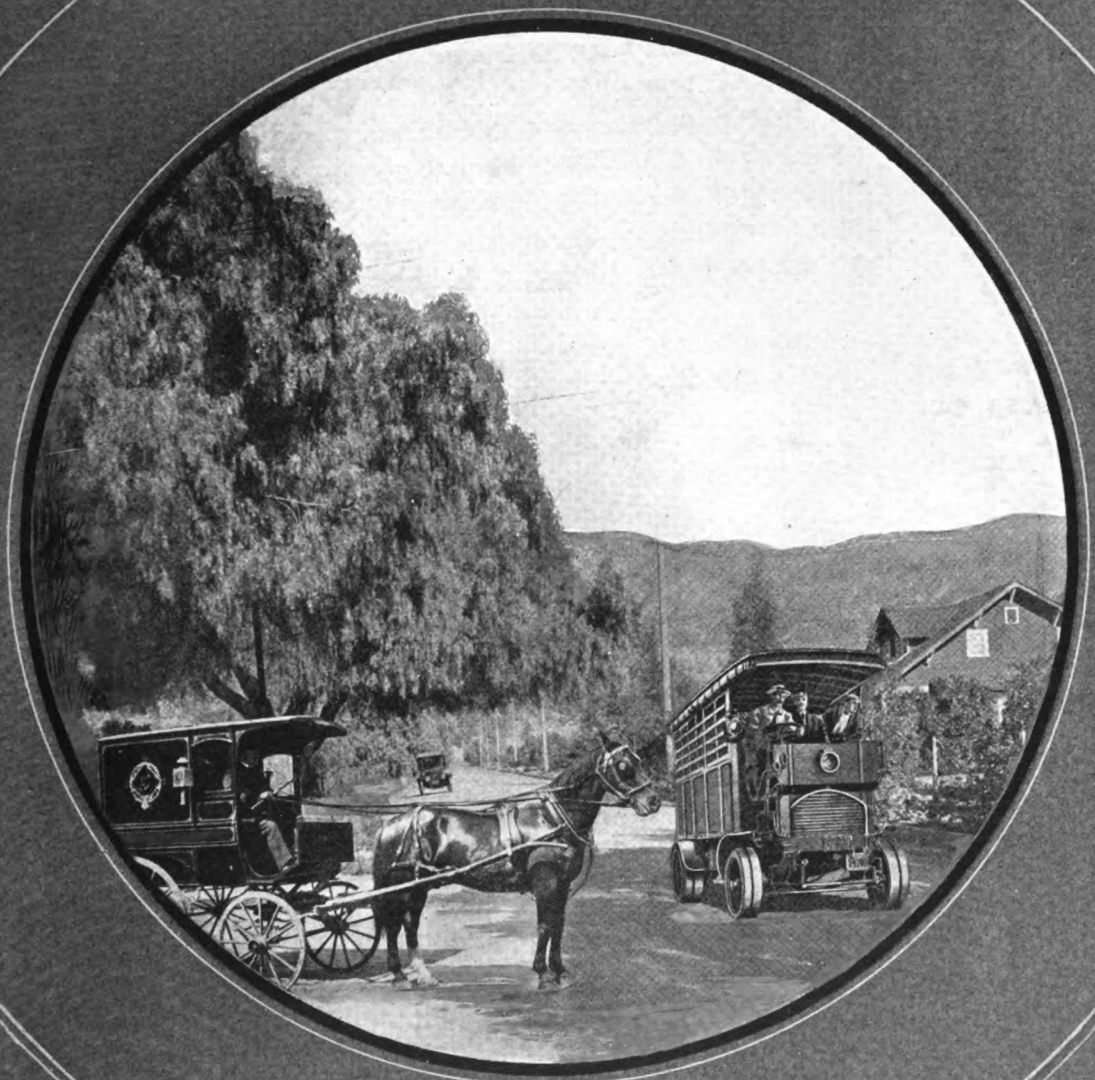
Furnished in rights and lefts for any height of arch. Oval Axle Clips 5/8 or 3/4 width to match Oval Couplings. Bolts, Clips, Couplings, Carriage Hardware and Special Forgings

Catalogue "H" and Prices on Application



COLUMBUS BOLT WORKS, Columbus, O.

The Hub



TRADE NEWS PUBLISHING COMPANY
24-26 MURRAY ST. NEW YORK

CORTLAND CARRIAGE GOODS CO.

CORTLAND, NEW YORK

BULLETIN IV.

Our selling prices for the coming year have been made and our Salesmen have now been soliciting contracts for some time. These prices are based on costs.

Last year was a very successful season for the Carriage Manufacturer and this year bids fair to equal or surpass it in volume of business.

Our equipment and capacity have been increased for the coming season, but there is a top to what we can do.

Many customers have already closed with us on Contract for next season. We would call the attention of all customers, who for any reason may have delayed signing Contracts, to our Guarantee against decline of prices. This guarantee protects every customer so that there is nothing to lose and much to be gained by signing a Contract and placing specifications at once.

Shrewd Buyers know that orders for pattern-made goods cannot be filled in a day and they also know that, when once past, time invaluable for filling orders cannot be recalled nor made up.

The Hub

Copyright, 1913, by the Trade News Publishing Co. of New York

Entered in the New York Post Office as Second-class Matter

Vol. LV SEPTEMBER, 1913 No. 6

THE TRADE NEWS PUBLISHING CO. OF N. Y.
Publishers of THE HUB

J. H. Wright, *President.* G. A. Tanner, *Secretary and Treasurer.*
24-26 MURRAY STREET, NEW YORK.

Other Publications of Trade News Publishing Co.:
HARNESS (monthly).....per year, $1.00
AMERICAN HARNESS AND SADDLERY DIRECTORY (annual).....per copy, $4.00

The Hub is published monthly in the interest of employers and workmen connected with the manufacture of Carriages, Wagons, Sleighs, Automobiles and the Accessory trades, and also in the interest of Dealers.

Subscription price for the United States, Mexico, Cuba, Porto Rico, Guam, the Philippines, and the Hawaiian Islands, $2.00, Canada, $2.50, *payable strictly in advance.* Single copies, 25 cents. Remittances at risk of subscriber, unless by registered letter, or by draft, check, express or post-office order, payable to the order of Trade News Publishing Co.

For advertising rates, apply to the Publishers. Advertisements must be acceptable in every respect. Copy for new advertisements must be received by the 25th of the preceding month, and requests to alter or discontinue advertisements must be received before the 12th day of the preceding month to insure attention in the following number. All communications must be accompanied by the full name and address of writer.

FOREIGN REPRESENTATIVES:

France.—L. Dupont, publisher of *Le Guide due Carrossier,* 78 Rue Boissiere, Paris. Subscription price, 15 francs, postpaid.

Germany.—Gustave Miesen, Bohn a Rh. Subscription price, 12 marks, postpaid.

England.—Thomas Mattison, "Floriana," Hillside Avenue, Bitterne Park, Southampton. Subscription price, 12 shillings, postpaid.

Entered in the New York Post Office as Second-class Matter.

Very Interesting Developments

A little while ago we spoke of the progress of the cycle car abroad, and suggested it held large opportunities for the vehicle builder here. We regarded it as the one best bet of the times for the horse-drawn vehicle builder, and suggested that he look into the prospects of the chance.

We have no present idea what weight, if any, our words had. The buggy builder is very conservative, generally he doesn't move until he is moved, and such motion is too slow to be of much value.

We are only beginning to see the development of the low-priced motor car by whatever name it is labeled, and we are only beginning to see the work of simplification of parts, and as to simplification of prices—well, we now think we might have been over the mark when we forecasted a $200 vehicle.

The fallow field that is open for profitable cultivation along lines of simple and cheap cars is so large that it becomes imaginative. It excites the fancy, it tickles the pocket nerve, it shows unending vistas of good, steady business that would have set the makers of heavy cars daffy if they could have had such dreams.

But we are afraid the opportunity will pass, as usual, by a lack of quick response among builders. Others more alert, but not so well situated to handle the traffic, will jump over the fence and have their business plows turning over the furrows of opportunity long before the buggy man thinks it is a good day for plowing, anyhow.

This cycle car is such a simple proposition. It practically can be assembled with a wrench and a smith's forge. It is so interesting as a vehicle. It combines the lightness, the speed, the low cost, the small selling price, the volume of business that make for big trade. It doesn't require a society of mechanical engineers to brood over its complexities, and add more by deliberation. It can even be run, and well and safely and swiftly run, without axles. It is a beautiful little problem. As for its trade negotiation, the buggy builder has his distribution source ready made, and as for the publicity, there will be no end of printer's ink spilled over thousands of pages without personal cost, just because the theme will be popular. This is such a big advantage for anyone who embarks in the business that it is too evident to discuss.

In our news pages already the note of preparation is sounded. There is not one, but a squadron of Richmonds in the field, making ready with drawings, with estimates, with models, to eat up the trade cake. We note, too, with pleasure, that one ex-buggy builder with forty years of all kinds of experiences in vehicle building from buggies to motors, has seen the light and jumped into it before it had time to do more than raise above the trade horizon. His enterprise will be rewarded.

We hope we may in the near future make note of the entry into the cycle car field of many of those vehicle builders who want to expand, and who have been saying the buggy business is done to a turn on both sides because of too many cooks.

Who will be the Ford of the new departure?

The Wild Call of the Wild

The latest is a plaintive note from India Rubber World. It is all about the tariff that is not yet a tariff. This is what may happen, and it's so dreadful a shudder goes free with each perusal: "Brazil's crude rubber industry is threatened by eastern plantation rubber. Labor in the Brazilian rubber sections was, and is, scarce and high priced. At the call of the cheap and abundant labor in Ceylon, the Malay states, Java and contiguous territory,

the Brazilian industry of Para rubber production was moved half across the world in less than ten years. So much for tropical industries. Now as to those of the temperate zone. There are in China millions of capable workmen who would joyfully hustle fifteen hours a day for fifteen cents. They would make excellent workers in any line of rubber manufacture where labor is a chief consideration. Their call to American manufacturers has heretofore been unheeded. But, if competition with European cheap help is forced upon the American manufacturer, and further if to meet such competition he is not to be allowed to adjust his wage scale to suit new conditions, will he not be forced to listen to this call? In the light of rubber history will not the present tariff program end in the establishment of great American shoe, tire and sundries factories in Chinese centers of cheap labor?"

What Does the Maker Make?

We have so often spoken about the part the accessory parts maker performs in the making (!) of the car, that further comment will add nothing to the point made.

It is interesting to show the man who is hesitating about venturing on the production of an assembled car, how easy it is, and how little of his own capital he would need to use to be a high-degree manufacturer (?) while doing just a little painting, varnishing and trimming.

We instance a recently advertised case in point. An ex-carriage builder saw the possibilities of the automobile soon, and he closed his carriage shop and opened his auto shop promptly. He copied all the "features" of the "game." He raced his cars, he worked the publicity (free advertising), and every other device that his neighbors employed. He just did as the others did. He assembled ideas, just as he did his cars, and without a featherweight of originality built up a large trade and big bank account.

Latterly he has frankly come out with the statement that the "standardized" (assembled) car is far and away the best, and says he uses only the best as—"Timken axles and bearings, Northway three-point suspended unit power plant, Mayo radiator, Gemmer steering gear, Delco electric system, Spicer universal joints, Detroit Steel Products springs, Janney-Steinmetz seamless steel gasoline tank, Hydraulic pressed steel frames, Firestone tires, Firestone demountable rims, Warner speedometer, Stromberg carburetor, Taylor tire pump (motor driven), Collins curtains."

Why do not others try it?

Prices Continue to Decline

The new Ford prices that were announced in August in place of October, and the new ($950) price of the Overland, continue the tendency to lower prices that this journal suggested a year ago as sure to make themselves manifest.

The Ford concern stoutly maintains that the published list is the lowest and only prices at which the cars may be purchased, probably as an estoppel to the rumors about three for a thousand that have gained currency.

The editor of this journal has a friend who lives in New Jersey who was the recipient of a circular from a man who said he was a Ford agent, who proposed that the man who received the circular find two others who wanted Ford runabouts, and the three cars would be delivered as one parcel for the sum of a thousand dollars. The trade was not put through in this particular instance so far as we have heard.

This all is reminiscent of the time of Lou Cook and his Cincinnati buggy at three for a hundred. Cook could be called the father of the cheap wholesale buggy, probably. It may be Mr. Ford's place in history to assume the title of the father of the cheap automobile. It is in both instances a matter of a quantity basis. Mr. Cook's buggy was something dangerous as a vehicle, but no such imputation can lie against the Ford car. Both are in the pioneer class, and both did and are doing a useful and desired work for the greatest number.

Buggy Business Good

Reports from many sections are to the effect that the buggy trade this season is very good.

The manufacturers have supplied a big product, and now there are reports from dealers that they are working off the product very well.

A large dealer in Illinois says that so far this has been his best buggy year.

When a farmer purchases an automobile, it doesn't mean he discards the buggy, according to this dealer. He usually gets a new buggy, too, in keeping with the motor car, and some farmers have three or four horse vehicles on the premises for different members of the family. The buggy field has no bounds yet.

Exhibit in St. Louis in October

There are manufactured annually in St. Louis and within a few hours' ride of that city from 200,000 to 250,000 horse-drawn vehicles. It is worth while to look after this trade. The exhibition of the C. B. N. A. furnishes an opportunity to show to these manufacturers what will benefit them.

British Commercial Car Show

It is several years since an exhibition of commercial vehicles was seen in London, but the latest show (July) under the auspices of the Society of Motor Manufacturers and Traders was opened with a grand flourish and an H.R.H. to do the official part of the opening.

Sixty-three exhibitors were present, not one showing an electric at the opening. Many steam motors were on the floor, but the distinguishing feature was the number of Knight engines shown on the cars. It was a

great time for this successful inventor of the sleeve valve. Day was really turned into Knight.

The show is a success, though the number of exhibitors does not seem much of a crowd according to the American idea of such affairs.

The Complexity of It

In one of the crank cases turned out by the makers of the Continental motor there are ninety-five holes to be drilled. This is instanced to show the multiplicity of parts that run up so high in the motor as at present constructed. Some day much of this detail will be abolished, it is to be presumed, and the motor will assume more of the simplicity that will make it more serviceable.

Kilowatt vs. Horsepower

It is proposed to use kilowatt, K standing for the abbreviation, in place of horsepower, in cataloging the power of a gasoline motor.

A kilowatt about equals 1.34 h.p.; this would make a 40 h.p. equal a 30 k.

The German and English engineers are promoting the change, and in Germany, after the first of the ensuing year, that is the term to be used to the exclusion of any other, either for gas or electric motors.

THE VEHICLE LEAGUE MEETING AT ATLANTA, ANSLEY HOTEL, AUGUST 27

The organization known as the Vehicle League had its beginning in Charlotte, N C., June 17, 1913, with 22 members, mostly from Virginia and the Carolinas. In order to complete its formation and extend its borders, the league held its second meeting at Atlanta, Ga. Sixteen manufacturers from Virginia, the Carolinas and the middle west were in attendance, and eight out of the ten Georgia manufacturers had representatives present.

The meeting was called to order by Mr. Blount, of the Blount Buggy and Carriage Co. He welcomed the vehicle manufacturers to Atlanta in his usual gracious manner, and called attention to the fact that the vehicle center of the country is rapidly moving southward.

President Geo. Hackney, of Wilson, N. C., after responding to these words of welcome in a few forceful sentences, gave as the keynote of the main objects of the league the safeguarding of credits, and a return to sane and safe business methods.

Entire accord was expressed by those present with the movement to get together in co-operative effort toward improving trade conditions generally in the southeastern territory. The interests of both dealers and manufacturers demand it, and the large accessory interests and southern banking connections endorse the object of the league.

Report of the work done by the governing board was made by the secretary, and general discussions followed on subjects of credit information, advancing prices of material and labor, bad terms, and transportation problems.

Mr. C. C. Hull, of Connersville, Ind., was present by invitation at this meeting, receiving an ovation as he entered the assembly room. At the informal luncheon his talk was straight from the shoulder and full of good sense. He took his subject from the spirit of the meeting and emphasized the great benefit to be derived from co-operation and mutual faith and trust and united effort, reciting how an injury to one is a calamity to all. Mr. Hull's review of the present state of the vehicle industry was an inspiration, and he hopefully forecasted good times to come.

Six additional members were received at this meeting, making total enrollment 28. The general results of the meeting were satisfactory, and the social features very enjoyable.

The league will reassemble on call from the governing board.

FOREIGN AND AMERICAN LIMOUSINES

(See Illustrations)

This month we focus attention on the treatment of the limousine body, here and abroad.

We are indebted to La Carrosserie Automobile for the foreign illustrations and a working draft of one of them.

Our purpose is to institute comparisons, show tendencies, and note the influence of French thought on our domestic drafting. We think we have chosen the style of heavy body that best points out these features.

The one American example is a product from the excellent Peerless body shop at Cleveland, and aside from the lines of the body, there are details of finish that are too interesting to leave unnoticed. We here particularize them.

The most striking feature, as the illustration makes plain, is the wide area of plate glass employed—the view in all directions is practically unobstructed; the rear wall is provided with a window that is as liberal in its dimensions as those in the sides. A considerable area of clear glass has been gained by eliminating framing and employing heavy plates of glass sliding in grooves. Side and partition windows are raised and lowered by means of straps, while the windows in the doors are moved by a patented handle device which, when turned, moves the glass and holds it in any position by means of automatic clutches.

The doors are so designed that they open flat against the body, which they cannot touch. Full opening of door is available. Electric step-lights are automatically switched on by the opening of doors. The interior lights are of the Pullman car type—when not in use each lamp is concealed by a silver plate which, when a button is pressed, swings around and brings the lamp into position, at the same time switching on the current. Pressing another button causes the lamp to disappear and go out. The lamps are built into the corners.

The auxiliary seats, of a new type, controlled by the Peerless, fold, when not in use, into the partition wall entirely out of the way. The backs of these seats are adjustable for height. The regular seats are improved to such an extent that they are said to be even more easy than the seats of the older Peerless cars. Communication with the driver is through an electric telephone embodying the microphone principle, which reproduces spoken instructions more clearly than they can be transmitted by means of the usual speaking tube.

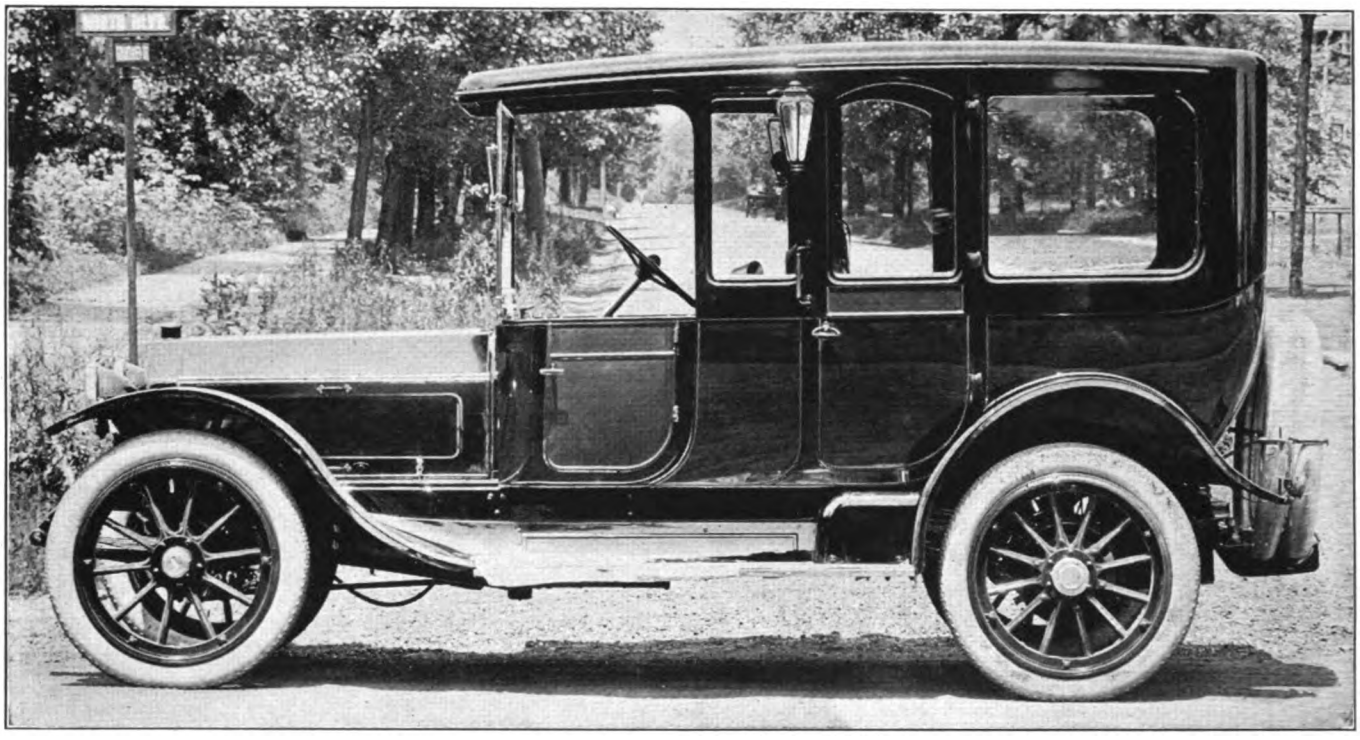
FIRST ANNUAL MEETING OF THE COACH BUILDERS, WHEELWRIGHTS, AND MOTOR BODY BUILDERS' ASSOCIATION OF N. S. W.

The first annual meeting of the Coach Builders', Wheel-Wrights' and Motor Body Builders' Association of New South Wales was held at the Employers' Federation rooms June 10.

The association was formed at a meeting of metropolitan coach builders, convened by Mr. G. H. Olding, and held in Sydney on June 13, 1912. On June 22 a constitution and rules were adopted; officers and committee men elected, and representatives for nomination to the Wages Board were selected.

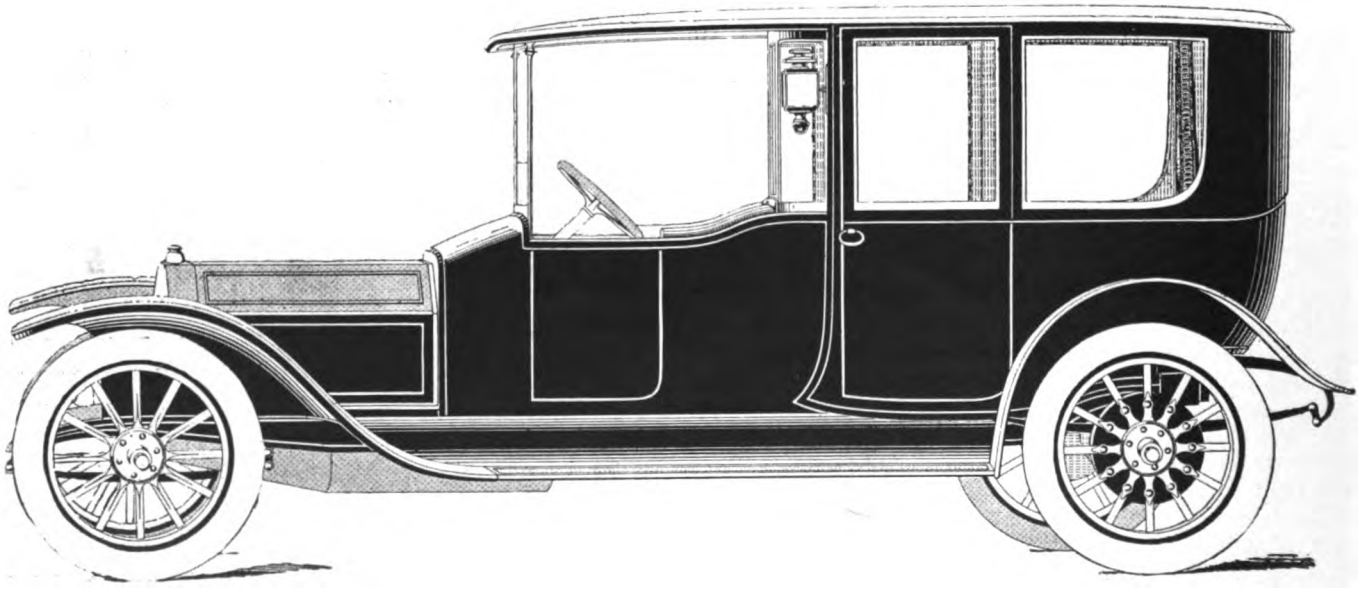
At the third meeting, held on July 5, a membership of over 50 was reported.

Foreign and American Styles in Limousines

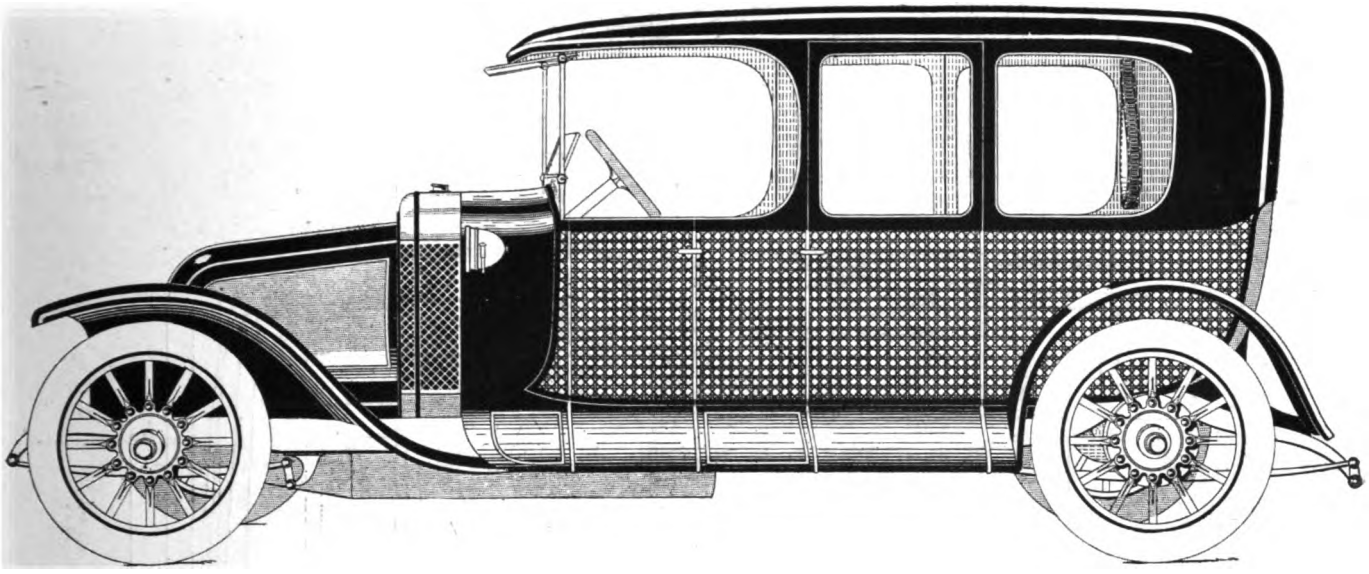


PEERLESS LIMOUSINE

Described on page 189

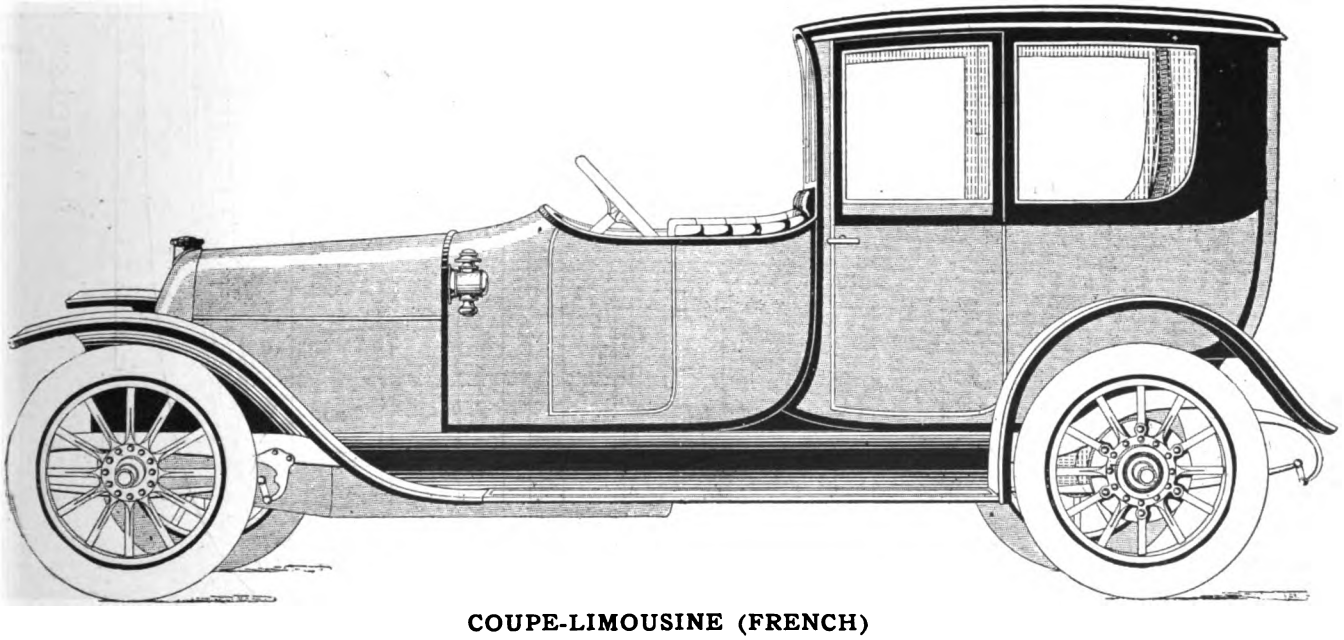


THREE-QUARTER LIMOUSINE (FRENCH)

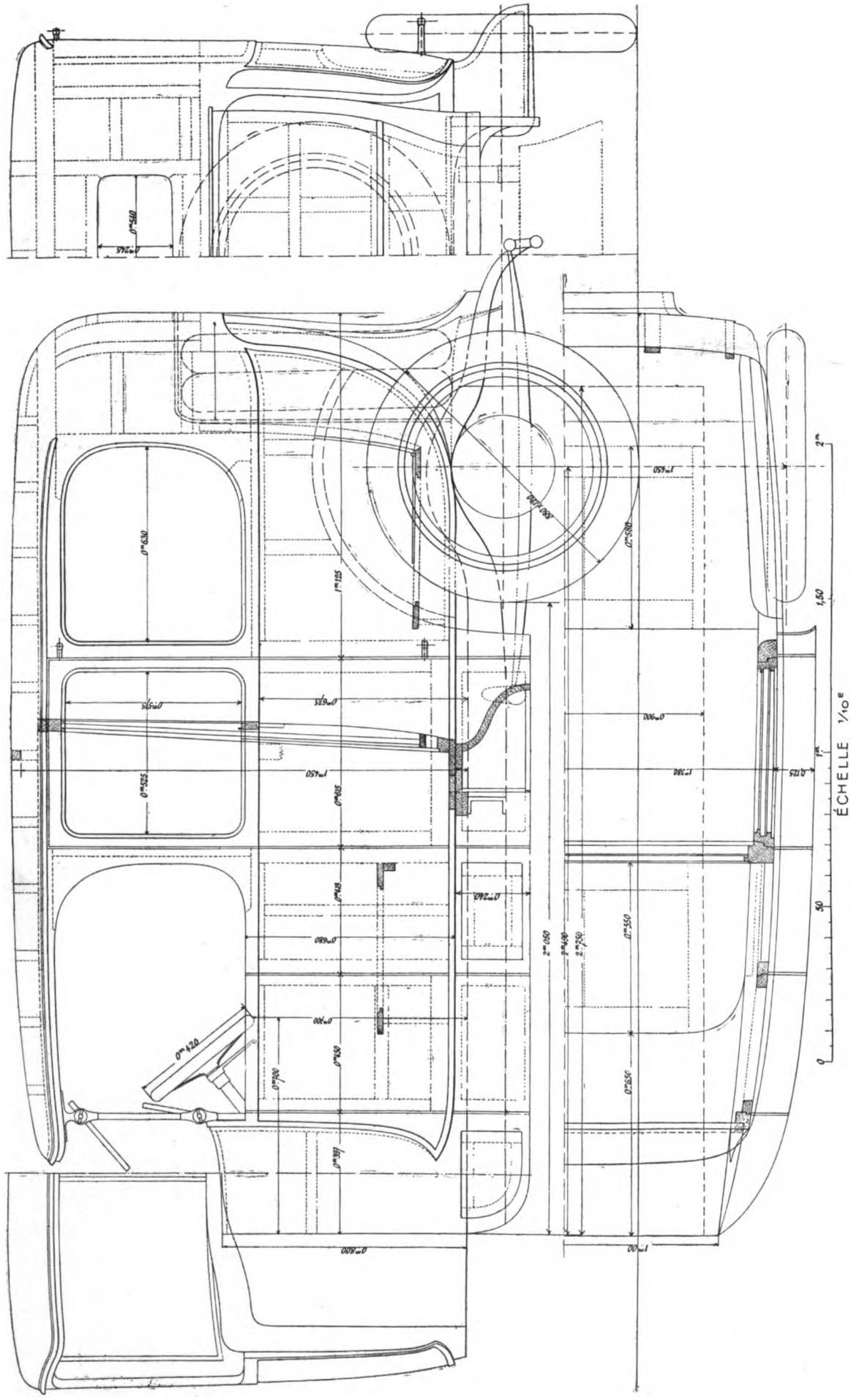


LIMOUSINE TOURING CAR (FRENCH)

For working drawing see page 192



COUPE-LIMOUSINE (FRENCH)



WORKING DRAWING LIMOUSINE CAR
From La Carrosserie Automobile

OFFICIAL ANNOUNCEMENT

Forty-first Annual Meeting Carriage Builders' National Association, October 14-16, to Be Held at the Coliseum, Jefferson and Washington Sts., St. Louis, Mo.

FIRST DAY—TUESDAY

It is the desire of the president and the association that the proceedings shall open promptly at the hour named.

And to this session all the ladies visiting the convention are most cordially invited.

The meeting will be called to order by the president, Mr. Charles C. Hull, Connersville, Ind.

Address of welcome by His Honor Henry W. Kiel, Mayor of St. Louis.

Response on behalf of the association by Mr. E. M. Galbraith, Cincinnati, O.

Opening address by the president, Mr. Charles C. Hull.

Short address and talks by our members and other representatives of both the vehicle and the acceessories trades on the condition of these industries, and what can be done for their benefit.

Nomination of president for the ensuing year.

Appointment of a committee on resolutions.

Appointment of a committee to recommend officers for the ensuing year.

Appointment of a committee on the exhibition.

Appointment of an obituary committee.

Adjournment.

On this Tuesday evening, October 14, the reception to the members and ladies will be at the Planters Hotel, from 8 to 11 o'clock. All members and their ladies attending the convention are invited to be present. Tickets for this reception will be furnished free to members and their ladies.

SECOND DAY—WEDNESDAY

Meeting will be called to order by the president, Mr. Charles C. Hull.

Address by Mr. Russell E. Gardner, St. Louis, Mo.

Address by Mr. H. P. Bope, first vice-president of the Carnegie Steel Co., Pittsburgh, Pa., "The Future of Steel, with Incidental Reference to Allied Lines."

Report of the executive committee, Charles A. Lancaster, South Bend, Ind., chairman.

Report of the secretary and treasurer.

Report of the committee to recommend officers for the ensuing year.

Election of president.

Adjournment.

THIRD DAY—THURSDAY

Meeting will be called to order by the president, Mr. Charles C. Hull.

Report of the committee on statistics, Mr. O. B. Bannister, Muncie, Ind., chairman.

Report of the trustees of the Technical School, Mr. Charles J. Richter, New York, chairman.

Report of the committee on freight and classification, Mr. Theo. Luth, Cincinnati, O., chairman.

Report of committee on abuses in the carriage and accessory trades. Mr. Perrin P. Hunter, Cincinnati, O., chairman.

Report of the committees on new members, Mr. W. H. Roninger, St. Louis, chairman central division; Mr. C. O. Wrenn, Norfolk, Va., chairman southern division; Mr. W. H. Son, Wilkes-Barre, Pa., chairman eastern division.

Report of the committee on the press, Mr. J. Frank Hutcheson, Cincinnati, O., chairman.

Consideration of the report of the executive committee.

Unfinished business.

New business.

Election of officers.

Report of the committee on resolutions.

Report of the committee on exhibition.

Report of the obituary committee.

Selection of the place for the next convention.

Adjournment.

Annual Banquet—Planters' Hotel, Thursday, at 7:30 O'clock

Tickets for the banquet can be obtained from the secretary at St. Louis.

At the annual convention, held in New York, October 9, 1907, a resolution was passed "that the secretary be required to charge for all extra tickets the cost of the same per plate." As this banquet will cost slightly over $7 per plate, the extra tickets will be $7 per ticket.

This does not concern the members' own tickets, as they are entitled to one ticket free. Only applies to the extra tickets any one may wish to have. Please note this so there will be no misunderstanding.

For the accommodation of the members of the association, the secretary will be at the exhibition hall on the afternoons of Tuesday, Wednesday and Thursday, October 14, 15, 16, from 2 until 5 o'clock, for the reception of new members, giving out banquet tickets, and such other business as may be required of him. The members are earnestly requested to procure their banquet tickets as early as possible, so that we can tell who will be present at the dinner.

To prevent mistakes and misunderstandings, the executive committee has adopted the following rule: Members of the association who desire their representatives to use their banquet tickets must give an order for the same in writing to the secretary.

Special Notice

The attention of members is particularly called to the excellence of the program for these meetings, and to the prominence of the speakers secured to deliver the addresses. Each one of the gentlemen who are to speak on the subjects assigned them is an expert in his line, and the subjects chosen are of vital importance to all.

No one will fail to be instructed and gain practical knowledge that will be of benefit to him. Your presence is most earnestly desired.

Business Meetings and Exhibition

Both the business meetings and the exhibition will be held at the Coliseum, St. Louis, Mo.

The Reception

The annual reception will be held on Tuesday evening, October 14, at the Planters' Hotel, from 8 to 11 o'clock.

The Banquet

The annual banquet will be held at the Planters' Hotel, Thursday evening, October 16, at 7:30 o'clock.

Letters to the Secretary

As the secretary has to be in St. Louis some days before the convention dates, all letters to him requiring an answer should be mailed so they will reach him at Mount Vernon, N. Y., on or before October 6.

It is assured that there will be several short conversations and addresses by our own members at the meetings on Tuesday and Wednesday mornings. The president and the association most respectfully request all members and visitors, especially the exhibitors and their attendants, to be present at these meetings, to aid in making them successful. There will be many things discussed that will be interesting and profitable to all.

These meetings will be short, not over one and one-half hours, from 10:30 a. m. to noon.

After October 6, the address of the secretary will be the Planters' Hotel, St. Louis, Mo., until after the convention.

By order of the executive committee.

HENRY C. McLEAR, Secretary.

TO DATE THE FOLLOWING CONCERNS HAVE SECURED SPACE IN THE C. B. N. A. EXPOSITION AT ST. LOUIS—PROSPECT OF BIG LINE OF EXHIBITS GOOD—THE EARLY BIRD GETS THE BEST SPACE—GET INTO LINE NOW

Blacksmith and Wheelwright, New York.
Backstay Machine and Leather Co., Union City, Ind.
C. C. Bradley & Son, Syracuse, N. Y.
Carriage and Wagon Builder, Philadelphia.
Carriage Dealers Journal, Troy, N. Y.
L. C. Chase & Co., Boston, Mass.
Cleveland Hardware Co., Cleveland, O.
Cately & Ettling, Cortland, N. Y.
Central Mfg. Co., Connersville, Ind.
C. Cowles & Co., New Haven, Conn.
Geo. R. Carter Co., Connersville, Ind.
Cortland Carriage Goods Co., Cortland, N. Y.
Carriage Woodstock Co., Owensboro, Ky.
Richard Eccles Co., Auburn, N. Y.
Fabrikoid Co., E. I. Dupont de Nemours Powder Co., Wilmington, Del.
Fernald Mfg. Co., North East, Pa.
Firestone Tire and Rubber Co., Akron, O.
Fairfield Rubber Co., Fairfield, Conn.
Federal Rubber Mfg. Co., Milwaukee, Wis.
Ditzler Color Co., Detroit, Mich.
Goodyear Tire and Rubber Co., Akron, O.
Gramm-Bernstein Co., Lima, O.
The Hub, New York.
Illinois Iron and Bolt Co., Carpentersville, Ill.
Indiana Lamp Co., Connersville, Ind.
Ideal Lamp Co., Cincinnati, O.
King Fifth Wheel Co., Philadelphia.
The Herbrand Co., Fremont, O.
Liggett Spring and Axle Co., Pittsburgh, Pa.
Lowe Bros. Co., Dayton, O.
Mutual Wheel Co., Moline, Ill.
Metal Stamping Co., Long Island City, N. Y.
Muncie Wheel Co., Muncie, Ind.
Monarch Carriage Goods Co., Muncie, Ind.
National Malleable Castings Co., Cleveland, O.
Pioneer Pole and Shaft Co., Piqua, O.
Peters & Herron Dash Co., Columbus, O.
P. Rielly & Son, Newark, N. J.
James H. Rhodes & Co., Chicago, Ill.
Rose Mfg. Co., Philadelphia.
R. E. Rodriguez, New York.
Union Bow Co., Cleveland, O.
The Spokesman, Cincinnati, O.
Standard Wheel Co., Terre Haute, Ind.
Edward Smith & Co., New York.
Sheldon Axle Co., Wilkes-Barre, Pa.
St. Marys Wheel & Spoke Co., St. Marys, O.
Sherwin-Williams Co., Cleveland, O.
Valentine & Company, New York.
Ware Bros. Co., Philadelphia, Pa.
C. A. Willey Co., Hunters Point, N. Y.
Wapakoneta Wheel Co., Wapakoneta, O.
D. Wilcox Mfg. Co., Mechanicsburg, Pa.
Western Spring and Axle Co., Cincinnati, O.
Wade Mfg. Co., Brockton, Mass.

DON'T STAND AND THINK ABOUT IT, BUT GO! YOU WILL BE THE GAINER

To the Manufacturers of Carriages, Wagons and Sleighs:

The Carriage Builders' National Association herewith extend to you a cordial invitation to attend the Forty-first annual meeting of their association, to be held in the Coliseum, St. Louis, Mo., October 23 to 27 of this year.

Also to visit the exhibition of the materials used in the construction of your productions, which will be held in the same building in conjunction with the convention. Bodies, gears, springs and almost everything you require in your business, and of which you should have full knowledge, will be shown.

While we would be pleased to have you become a member of the association, you will be welcome to both the exhibition and the convention whether a member or not, as they are free to all vehicle builders.

By attending the convention you will meet many representatives of the best and largest manufacturers of vehicles in the country, renew old friendships, make new acquaintances, and hear something at the meetings, which we feel sure will be beneficial to you.

Whether your business is large or small it always pays to keep fully informed of the new things entering into the construction of your productions.

You will see the best of everything in this exhibition, and we are sure you will be amply repaid for your visit.

HENRY C. McLEAR, Secretary. CHARLES C. HULL, President.

GETTING READY

Arrangements for the Carriage Builders' National Association convention in charge of the Implement, Vehicle and Hardware Association, of St. Louis, are progressing in good shape. A complete program of the convention will be issued by the local committee and mailed broadcast to all members of the association, independent of the official notices, for the information and convenience of all visitors. These will be mailed about October 1 and should be preserved by those attending. In this way one will take no chance on missing any of the good things as they come along.

FEDERATION CONVENTION DATES

The National Federation of Retail Implement and Vehicle Dealers' Association will hold their 1913 convention at Chicago, October 14-16. The meetings will be held at the Lexington hotel. A new feature of this year's Federation meeting will be a conference of the secretaries of all the state and interstate implement associations of which the Federation is composed. This conference will be held October 13, the day before the opening of the convention. All associations are expected to send their secretaries as delegates to the convention so that they may be present at the conference and take part in the deliberations. Important results are expected from the secretaries' meeting.

RACINE CARRIAGE CO.'S PRESIDENT HURT

Francis Jewett Johnson, millionaire head of the Racine Carriage Co., and a member of Lake Forrest's crack polo team, was seriously injured at the annual gymkhana of the Lake Forest Horse Show association at the Onwentsia Club.

Mr. Johnson escaped death by a fraction when his horse fell and rolled over him.

The accident occurred in the third heat of the steeplechase for polo ponies. Mr. Johnson had won the first heat and Laurence Armour the second.

In the third heat Mr. Johnson was in the lead, and after clearing a hurdle with Mr. Armour in close pursuit the pair were just rounding a curve in the track when Mr. Johnson's horse slipped and fell.

The rider was thrown heavily, and as he hit the ground his pony rolled on top of him. He was removed to the Alice hospital.

All Aboard for St. Louis

. . . on . . .

"THE HUB'S"

Special Train to the C.B.N.A. Convention

The Hub will run a special train to St. Louis on account of the convention of the Carriage Builders' National Assn.

It will leave New York Sunday, October 12, at 10:04 a. m.; North Philadelphia, 11:57 a. m.; Harrisburg, 2:45 p. m.; Pittsburgh (central time), 8:05 p. m.; Columbus, 1:15 a. m. (Monday); Indianapolis, 6:55 a. m.

The train will carry drawing room sleeping cars and dining car (a la carte) of the famous Pennsylvania all-steel construction.

Go with this party and be with friends from start to destination. Talk about it among your trade acquaintances and get the other fellows interested—the bigger the crowd the more pleasant the trip will be.

Reservations for Pullman accommodations should be made at once—they can be made to start from any of the above mentioned points.

All reservations should be sent to

"THE HUB"

24 Murray St., New York

NOTE FOLLOWING ABOUT C. B. N. A. EXHIBIT IN ST. LOUIS

To the Members of the Carriage Builders' National Association:

Enclosed you will find the notice for the exhibition and the rules governing the same, to which we invite the attention of all our members who purpose making an exhibit this year.

You will notice that the exhibits must not be dismantled or removed, nor any preparation for removal made, until after 6 p. m. on Thursday, October 16. All exhibits must be removed from the hall by noon of Friday, the 17th, as our lease terminates at that time.

We would suggest you notify your representatives to stay with your goods and see that they are properly delivered to the transfer company for shipment. No other persons can do this nor tell if all have been shipped. This will prevent confusion. No one can tell to whom they belong, or where they are to go, nor can any one tell if they are properly cared for, unless the owners stay by them until they leave the hall. Please so instruct your agents.

The St. Louis Transfer Co. will deliver freight shipments from depots of railroad companies to the Coliseum and return them to the railroad station for reshipment at the following rates:

Consignments weighing over 300 pounds, round trip, per net ton	$8.00
Consignments weighing over 300 pounds, one way, per net ton	4.00
Consignments weighing under 300 pounds, round trip	1.50
Consignments weighing under 300 pounds, one way	.75

Shipments arriving prior to the time that delivery can be effected at the Coliseum will be stored at owner's risk at regular storage rates

Shipments should be consigned in care of St. Louis Transfer Co., at East St. Louis. Freight charges to St. Louis should be fully paid, and notice of shipment or bill of lading mailed to The St. Louis Ttransfer Co., 400 South Broadway, St. Louis, Mo., advising them when the exhibitor's representative will be at the building.

The above information is from the Transfer Co. Payment for their services should be made direct to the Transfer Co.

Edw. A. Langan Furniture Co., 2004 Morgan street, St. Louis, Mo., have in stock and will rent furniture for exhibition purposes at the following rates:

Three-foot golden oak roll-top desks, @	$5.00
Four-foot golden oak roll-top desks, @	5.00
Four-foot golden oak roll-top desks, @	4.00
Golden oak revolving chairs, @	1.50
Golden oak arm chairs, @	1.00
Golden oak side chairs without arms, @	.50
Golden oak 6-foot tables, @	1.50
Golden oak 5-foot tables, @	1.25
Golden oak 4-foot tables, @	1.00

Domestic rugs, 9 x 12 feet, from $3.50 to $5.00.

You can call at their place of business and select what you need.

This information is for the exhibitors, the association having no further interest in it.

We invite your attention to the following:

Extracts from the minutes of the Executive Committee as published.

"In relation to the order made at the Chicago convention relative to soliciting orders on the exhibition floor, the executive committee desires to call all members' attention to this, as they think a moment's reflection on the part of those not having any exhibit will convince them that it is unfair to those who have made the exhibition hall their office and salesroom for the time being, and paid for this opportunity to meet the vehicle trade, and that it is not right for any one not exhibiting to come on the floor and solicit trade that rightly belongs to those who have exhibits.

"As any member can secure space at these exhibitions if they desire to look for trade at same, they should take space and be on an equality with those who do.

"All members are welcomed to visit the exhibition, but fairness to those who pay for the privilege of exhibiting should prevent all from making unfair use of this privilege."

The following resolution was passed at the convention at Chicago in 1908:

"Resolved, That the secretary of the C. B. N. A. be instructed by the association to adopt such regulations as to exclude from the exhibit hall all representatives of the accessory trades that are not members of the association.

"Resolved, That the exhibitors and their representatives be furnished with a badge showing they are exhibitors or representatives of the same."

In accordance with the above resolution, the executive committee has arranged that the admission to the exhibition hall shall be by ticket, to be procured at the entrance door on registration.

This ticket will be provided free to ALL members of the association, both active and associate.

And also to all carriage, wagon, sleigh, automobile and motor car builders who are not members of the association.

But not to any manufacturer or dealer in the accessory goods who are not members of the association.

The exhibitors will be provided with badges for themselves and their attendants as the above resolutions call for, and these will be delivered to them on the first day the exhibition is open.

These resolutions can only be made effective with the cooperation of the exhibitors, and the committee requests all the exhibitors to aid in enforcing this rule.

We would also suggest that you instruct your representatives to carefully obey the rules as printed, and we will send you as many copies as you may need to provide enough for this purpose.

By order of the executive committee.

HENRY C. McLEAR, Secretary.

Mount Vernon, N. Y., June 20, 1913.

THE BOSTON SHOW

The Twelfth Annual Automobile Show will be held in Boston in the Mechanics Building.

The pleasure car division will continue from March 7 to 14 under the auspices of the Boston Automobile Dealers' Association.

The commercial cars will follow from March 17 to 21, under the auspices of Boston Commercial Motor Vehicle Association.

Full information may be had from Chester I. Campbell, General Manager, 5 Park square, Boston.

MIDLAND OFFERED 20 PER CENT.

The Midland Motor Co., of Moline, Ill., now has offered its creditors, through Vice-president Page and Treasurer Dietz, a composition amounting to 20 cents on the dollar. It is stated that the claims will closely approximate $400,000 and that the company's assets, including property at the plant, have been appraised at $119,000. A meeting of creditors will be called to pass upon the acceptability of the composition.

SALESMEN FAIR-LY BUSY

Implement and vehicle salesmen traveling out of Indianapolis are in the heat of the county fair season in Indiana. Twenty-six different fairs were held during August and about that many more are scheduled for September. In addition to this, practically all of the manufacturers will have exhibits at the Indiana State Fair, September 8 to 13.

FALL ANNOUNCEMENT TECHNICAL SCHOOL FOR CARRIAGE DRAFTSMEN AND MECHANICS

Board of Trustees of the Technical School: Charles J. Richter chairman; Hon. Franklin Murphy, W. W. Ogden, D. T. Wilson, Wm. R. Innis, secretary.

Andrew F. Johnson, instructor-in-chief.

Carried on under the auspices of the Carriage Builders' National Association, Mechanics' Institute, 20 West 44th street, New York.

The classes in carriage, wagon and automobile drafting and construction will open in the last week of September. Autumn term closes at Christmas. Winter term opens in the first week of January and closes in the second week of April.

Requirements for Admission to the Day or Evening Classes

1. The applicant must be engaged in the manufacture of pleasure or business vehicles.
2. He must be sixteen years of age or more.
3. Be able to speak, read and write English, and to write a fairly good business letter.
4. Have a knowledge of arithmetic, sufficient to solve problems in proportion, and also in square root.

Some knowledge of geometry is also desirable, but it is not required on entering.

Examinations for admission will take place the two weeks preceding the opening of the term; or at such time as may be arranged, to accommodate distant pupils.

These examinations will be conducted by the instructor, and will be held at the school rooms.

Examinations will be both written and oral.

Day Class

This class is to accommodate pupils who wish to devote their whole time to the study of vehicle drafting. This class will meet each week day except Saturday during the term. Hours: 9:30 a. m. to 4:30 p. m. Instruction is free.

Evening Classes

Monday, Wednesday and Friday from 7:30 to 9:30 o'clock. Instruction is free.

All communications relating to the carriage builders' classes should be addressed to Andrew F. Johnson, instructor-in-chief.

Courses of Instruction

The pupils will be divided into three distinct classes, namely: the introductory or free-hand class, the class for the study of descriptive geometry, and the class for scale and full-size working drawings, and the following gives a general outline of the proposed studies: I. Linear designing, including free-hand, scale, perspective, colored and full-size drawing. II. Geometry applied to carriage, wagons and automobile construction and known as the "French Rule" of drafting. III. Carriage, wagon and automobile body making. IV. Construction of carriage and wagon gearings. V. Principles involved in the suspension and draught of carriages and wagons. Early application is necessary as desk room is limited.

Drawing instruments, drawing boards and other things necessary for the work may be had at the school at very low prices.

At the close of the term certificates of graduation will be given to such pupils of the day and evening classes as pass the necessary examinations.

The following conditions govern the graduation of pupils: No pupil will be entitled to a certificate of graduation unless he can pass, in the judgment of the trustees, a satisfactory examination in all the branches taught. He must, upon examination, evince a thorough knowledge of geometry as applied to carriage building, known as the French Rule of Drafting; show facility in making free-hand drawings, be able to make scale and full-size working drawings of carriages, wagons and automobiles, be able to give the proper sizes of the different parts of light, medium and heavy vehicles, and be able to write, clearly and correctly, orders for such parts as are made by special manufacturers, such as wheels, axles and springs, and be able to work out the problems connected with draught and suspension. A knowledge of perspective and colored drawings is also desirable.

These examinations will take place in the school rooms each year at the close of the winter term, and will be conducted by the board of trustees.

Graduates are in demand, and are holding good positions in the leading carriage and automobile factories.

Correspondence Department

Managed on the Chautauqua system. Instructor, Mr. Andrew F. Johnson.

Instruction will also be given by correspondence to the employes of carriage, wagon and automobile builders and members of the accessory trades, at their homes, by means of the so-called Chautauqua system.

This system consists in giving instructions to out-of-town pupils through the mail, by lesson paper, on making free-hand, geometrical, scale and working drawings, each paper calling for responses in the form of drawings or written replies, which are afterward examined and corrected by the instructor, Mr. Andrew F. Johnson.

Three terms are required in order to compelte the full course of corresponding lessons, which are 99 in number as follows:

First Series—Free-hand drawing. Eleven lessons.

Second Series—The use of mathematical instruments and curves, and mode of sketching a carriage. Ten lessons.

Third Series—Geometry applied to carriage construction; projection of points, lines and surfaces, laying out working draft of a phaeton body, and generation of surfaces illustrated on a phaeton. Eight lessons.

Fourth Series—Movements of triangles and lines in space; rules applicable to plane faces illustrated on a trestle, a phaeton pillar, a cabriolet pillar and bottomside of a landau, showing the method of finding the true size and shape of a pattern, and the bevel of shoulders of the cross bars. Thirteen lessons.

Fifth Series—On finding the dihedral angle, or in work-shop parlance, finding the bevel of the leg of a trestle, phaeton pillar, cabriolet pillar, and landau bottomsides. Six lessons.

Sixth Series—On the choice and disposition of joints. Three lessons.

Seventh Series—General dimensions applicable to vehicles, and laying out working drawings of a phaeton body and gearing. Five lessons.

Eighth Series—Laying out square and round-cornered stick seats, and round-paneled seats; generation of double-curved surfaces, illustrated by a barouche with round bottom-sides, including the study of different forms of bodies, such as drop-center landaus, and broughams with ogee turn-under; ogee front-quarter, bottomsides of coaches and barouches; cheat line and proportional triangle illustrated on a Clarence body and on a C-pillar back-quarter. Twenty-four lessons.

Extra Series—The draught of vehicles and division of weight, displacement of center of gravity, and objectionable modes of suspension. Four lessons.

Miscellaneous Series—New methods of determining the cheat line; locating the joints in top braces; developing outside surfaces having different side sweeps and turn-unders; developing mud guard surfaces by means of radial lines and by triangulation; developing automobile seat surfaces and strainers by use of the proportional triangle; developing automobile bonnets or hoods. Fifteen lessons.

On the receipt of tuition fee, all lesson papers for the term will be mailed to the pupil at once, in order that he can see to what the lessons are tending, and any pupil who has finished the study of the full term lessons, will, by sending tuition fee

for the next term to the instructor, receive the whole number of lessons for that term.

Written examination will be required at the end of each series of lessons, in order to test the progress and proficiency of pupils, and, at the close of the course, diplomas will be awarded to those deserving such recognition.

All employes of manufacturers of carriages, wagons and automobiles, and the trade accessory thereto, doing business within the United States and Canada, are eligible to membership in these classes of "corresponding pupils," the only conditions of entrance being: first, a letter of recommendation from the employer; and second, the remittance in advance, by post office money order of $5, which will cover all fees for instruction during one term.

Each pupil will be expected to provide himself with necessary drawing instruments, papers, etc., and to pay postage on all communications sent to the teacher.

Works of reference and text books will be recommended to pupils who show the need of such help; and, if desired, these, as well as drawing instruments, papers, etc., will be supplied at cost price by the teacher.

This department is kept open during the entire year, and pupils may join at any time.

MOLINE LICENSED TO BUILD KNIGHT MOTORS

Adding one more to the slowly lengthening list of automobile manufacturers who have embraced the Knight sliding sleeve valve motor, the Moline Automobile Co., of East Moline. Ill., has acquired a license to build and use the Knight motor, and will feature it in one of its 1914 model cars.

With the addition of the Moline Co., the list now includes five makes of cars in which the Knight engine is used; they are: Edwards-Knight, Stearns-Knight, Atlas-Knight, Columbia-Knight and the Moline-Knight.

A VACUUM ROAD CLEANER

Delegates from municipalities in all parts of Europe recently attended a demonstration in London of a new system of road cleaning by a patent dustless motor vacuum road cleaning machine. The road cleaner has been adopted, it is stated, by various foreign municipalities. It consists of a suction machine containing a stiff brush which revolves at great speed close to the ground, thus creating the suction necessary to remove every particle of dust, mud, or refuse in the road over which it passes. The refuse is automatically deposited in a covered bin at the back of the car, and the suction is so great that mud is withdrawn from the crevices between the stone blocks with which some roads are laid. Some of the muddiest parts of the city were used for the purpose of showing the efficiency of the machine. Paper, tickets, and coins, as well as dirt, were gathered up by the road cleaner, leaving the surface of the road absolutely clean.

This machine, in the opinion of the municipal engineers from various parts of England, is described as the most perfect device for road cleaning purposes yet discovered.

DODGE CAR AN $850 "FOUR"; NOT TO COMPETE WITH FORD

Apparently that Dodge car is not to be a "six," after all; nor is it to compete directly with the Ford. According to the latest information it is to be a four-cylinder machine selling for an amount in the neighborhood of $850.

John F. Dodge probably will resign the vice-presidency of the Ford Co., is reiterated by both Dodge brothers; no change will be made in the organization of Dodge Bros. The Dodge brothers have no present intentions of relinquishing their Ford holdings, which are valued at $25,000,000.

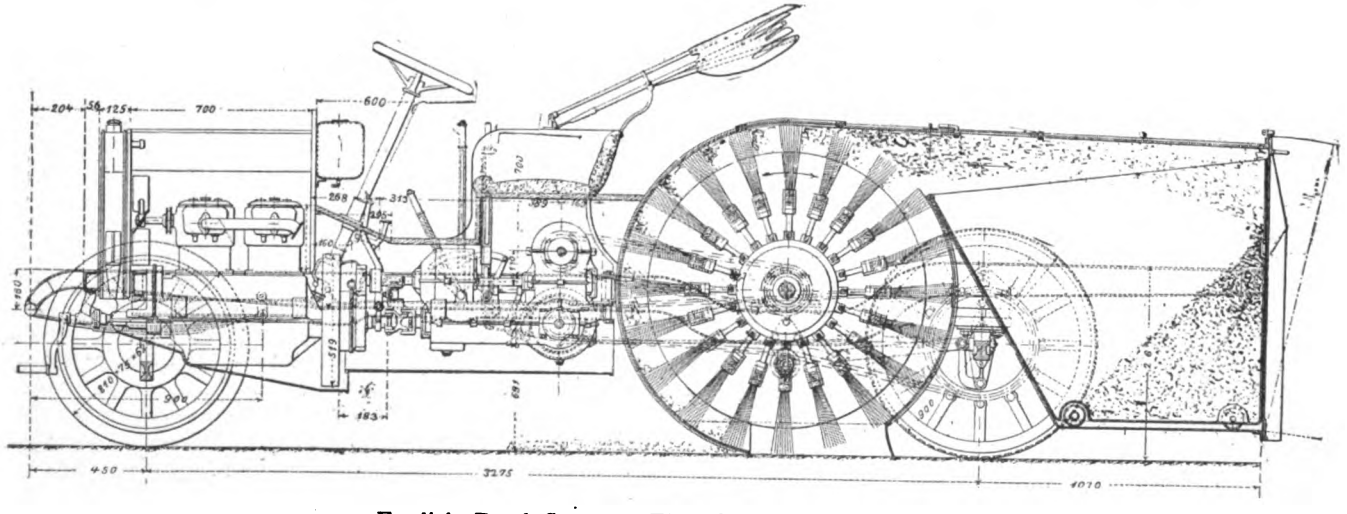
The Dodge Bros. plant is located on Joseph Campau avenue and for the past two years they have been acquiring 2,100 feet of adjacent property on Bismarck street. Their present plant is one of the largest and most modern in Detroit. A new assembling unit, 900 feet long, will be built at once to give about 20 acres additional floor space. Estimates place the additional number of men that will find employment in these two plants at from 8,000 to 20,000.

OBJECT OF HIGHWAYS ASSOCIATION

The National Highways Association estimates that more than $25,000,000,000 will be spent in the next 25 years on the 2,300,000 miles of highways in the United States. The wise expenditure of this vast sum is of paramount importance to the 100,000,000 people of this nation. The purpose of the association is to promote discussion, disseminate knowledge, and assist as to the best development of these highways. The association believes the most beneficent results will be obtained by first securing the building and permanent maintenance by the Federal Government of approximately 50,000 miles of highways throughout the United States as a great system of national highways; and next, to encourage the building of "good roads everywhere" as the distributing and collecting medium for the traffic of national highways.

BUGGIES IN DEMAND

Buggies are in good demand now. Both dealers and jobbers declare that this season will eclipse 1912 in the sale of these lighter vehicles. Constant requests are being made by farmers for immediate delivery upon various jobs.



English Road Sweeper That Is Producing Results

Wood-working Shop

CENSUS LUMBER STATISTICS

The information in this bulletin is based on reports received from 28,107 sawmills operating in 1911.

In 1899 and 1909 statistics were secured by special agents of the Bureau of the Census, practically every mill being reached. In 1904 the figures were obtained in connection with the quinquennial census of manufactures, which was confined exclusively to merchant mills. It was necessary to rely upon the correspondence method in obtaining the statistics for the other years shown in Table 1. For 1910 and 1911 mills sawing less than 50,000 feet are omitted from the statistics. Although there are a very large number of small mills, statistics secured in 1909 show that they supply but a relatively small proportion of the total output, and that the variation in the number of such mills reporting is of minor significance in determining the production for different years.

Table 1 shows the production of lumber in the United States and the number of active mills reporting in 1911 and in certain of the preceding years back to 1899.

Table 1—Lumber. Number of active mills reporting and quantity of products, for specified years: 1899 to 1911.

Year	Active mills reporting	Lumber M feet b.m.
1911	28,107	37,003,207
1910	31,934	40,018,282
1909	48,112	44,509,761
1908	31,231	33,224,369
1907	28,850	40,256,154
1906	22,398	37,550,736
1904	18,277	34,135,139
1899	31,833	35,084,166

The total production of lumber reported by 28,107 mills in 1911 was 37,003,207,000 feet, as compared with 40,018,282,000 feet reported by 31,934 mills in 1910.

Oak

There are nearly 50 different species of oaks growing in the United States, but in commerce they are divided about equally into two general classes, white and red. The table, however, recognizes no divisions and presents the cut of oak lumber under one heading.

State	Active mills reporting	Quantity (M feet b.m.)	Per cent. distribution
United States	17,025	3,098,444	100.0
Tennessee	1,399	382,033	12.3
West Virginia	952	381,977	12.3
Kentucky	1,375	342,609	11.1
Arkansas	765	299,187	9.7
Virginia	1,540	258,718	8.3
Pennsylvania	1,332	191,456	6.2
Ohio	940	181,279	5.9
Missouri	1,047	175,300	5.7
North Carolina	1,200	150,060	4.8
Indiana	836	146,922	4.7
Mississippi	358	101,385	3.3
Louisiana	109	89,212	2.9
Alabama	525	55,604	1.8
Illinois	380	52,298	1.7
Maryland	320	35,442	1.1
Wisconsin	465	28,181	0.9
Texas	117	27,866	0.9
Connecticut	198	27,601	0.9
New York	786	27,446	0.9
Georgia	374	25,033	0.8
Oklahoma	125	20,709	0.7
Michigan	345	15,346	0.5
All other states	1,537	82,800	2.7

Thirty-nine states contributed to the country's supply of oak lumber in 1911, and 17,025 mills reported it. The principal output is in Tennessee, West Virgina, Kentucky, Arkansas, and Virginia, which five states together produced more than half the total in 1911. Tennessee leads all other states, but West Virginia is not far behind, the difference being only a little more than a million feet in 1910, and less than 100,000 in 1911.

The output of oak in some of the old settled parts of the country holds up remarkably well. In 1905 the cut in Ohio was 161,843,000 feet, and in 1911, 181,279,000; Indiana supplied 175,816,000 feet in 1905, and 146,922,000 in 1911; Illinois, 38,601,000 in the former year, and 52,298,000 in the latter; and Pennsylvania, 133,052,000 in 1905, against 191,456,000 in 1911. The total output for the country in 1905 was 1,833,769,000 feet, and in 1911, 3,098,444,000. More than 800,000,000 feet, or over three-fifths, of this increase has taken place in the five states of Tennessee, West Virginia, Kentucky, Arkansas, and Virginia.

Oak lumber statistics for several years indicate that the production has passed its maximum, but, as figures for different years are not exactly comparable, a definite conclusion in this respect is not warranted.

Ash

No fewer than 14 species of ash are found in this country, and half of them are sawed into lumber. The most important is white ash, which grows from New England to Florida and westward to the prairies. Other species of considerable importance are black ash, ranging from New England to Missouri, but of little important south of the Potomac and Ohio rivers; red ash (which is widely dispersed over the eastern half of the United States, but is not abundant; green ash, a small tree, but widely distributed; and Oregon ash, a Pacific coast tree.

State	Active mills reporting	Quantity (M feet b.m.)	Per cent. distribution
	6,348	214,398	100.0
Ohio	584	21,995	10.3
Arkansas	150	20,138	9.4
Indiana	461	19,219	9.0
Wisconsin	338	18,008	8.4
Louisiana	54	15,509	7.2
Tennessee	378	15,331	7.2
Michigan	432	14,127	6.6
New York	897	10,727	5.0
Missouri	235	9,560	4.5
Pennsylvania	526	9,368	4.4
West Virginia	226	8,371	3.9
Kentucky	376	7,376	3.4
Mississippi	79	6,443	3.0
Vermont	231	4,244	2.0
All other states	1,381	33,982	15.8

Mills in 39 states reported ash in 1911. Ohio stood highest, but with only 10.3 per cent. of the total; Arkansas was second, Indiana third, and other states widely separated geographically ranked close together in quantity of lumber produced. Some old, thickly settled states are important producers of ash lumber, among such being Ohio, Indiana, New York, and Michigan. The total production was more than 31,000,000 feet less in 1911 than in 1910, the decline being general in nearly all parts of the country, indicating that no particular section has exhausted its supply. The average output per mill is small, amounting in 1911 to less than 34,000 feet.

Basswood

Two species of basswood probably figure in the lumber sup-

ply, the common basswood and the white basswood. They are so much alike that lumbermen consider them the same.

Thirty states furnished this wood in 1911 in the form of sawmill products, but nearly one-third came from Wisconsin alone and nearly half from Wisconsin and Michigan. Basswood does not form pure forests, the trees, as a rule, being so scattered that only a few are found on an acre. For this reason the average output per mill is small.

State	Active mills reporting	Quantity (M feet b.m.)	Per cent. distribution
	5,130	304,621	100.0
Wisconsin	538	95,249	31.3
Michigan	517	47,572	15.6
West Virginia	340	36,213	11.9
New York	1,067	29,638	9.7
Minnesota	240	13,846	4.5
Ohio	393	11,482	3.8
Pennsylvania	378	11,303	3.7
Vermont	279	9,217	3.0
Virginia	147	8,809	2.9
Tennessee	151	8,354	2.7
Kentucky	160	8,214	2.7
Indiana	231	7,455	2.5
Maine	136	4,394	1.4
North Carolina	122	4,273	1.4
All other states	431	8,602	2.8

Hickory

Hickory grows dispersed through forests of other woods, and few mills cut it exclusively, though there are mills cutting dimension stock which specialize on hickory. Such stock usually goes to vehicle and handle factories. In some instances large operators in the south take other species and leave the hickory standing, because they are not equipped to cut it in the dimensions which the best markets demand.

State	Active mills reporting	Quantity (M feet b.m.)	Per cent. distribution
	5,419	240,217	100.0
Arkansas	235	45,295	18.9
Tennessee	495	38,793	16.1
Kentucky	463	26,737	11.1
Ohio	664	18,882	7.9
Indiana	550	15,871	6.6
Missouri	405	14,301	6.0
Mississippi	83	14,127	5.9
West Virginia	342	13,343	5.5
Pennsylvania	544	10,231	4.3
Louisiana	28	6,656	2.8
North Carolina	198	6,157	2.6
Illinois	215	6,129	2.6
Virginia	254	5,016	2.1
Alabama	88	4,405	1.8
All other states	855	14,274	5.9

Hickory lumber is produced in 33 states, and more than half a dozen species contributed to the 240,217,000 feet reported by 5,419 mills in 1911. Ohio has more mills than any other state, but Arkansas leads all the other states in the quantity of hickory lumber produced, and has been near the top of the list for several years. Nearly half of the country's total reported output of this wood in 1911 came from three states—Arkansas, Tennessee, and Kentucky. The output of hickory lumber per mill is usually small, the average for the year 1911 being only 44,000 feet.

Elm

Several species of elm figure in the sawmill statistics of this wood in the United States. The most important is white or gray elm and next is cork or rock elm, while red or slippery elm and wing elm are utilized to a considerable extent. White elm, the common elm of commerce, is distributed more widely than the others, and grows in nearly all regions in the United States east of the Rocky Mountains. Cork elm is more restricted in its range, and is of commercial importance chiefly north of the Ohio River. This tree is generally called rock elm by lumbermen, but that name is occasionally applied to other commercial elms.

State	Active mills reporting	Quantity (M feet b.m.)	Per cent. distribution
	5,159	236,108	100.0
Wisconsin	492	55,193	23.4
Michigan	515	47,991	20.3
Ohio	575	25,927	11.0
Indiana	537	19,974	8.5
Missouri	445	15,318	6.5
New York	696	12,462	5.3
Arkansas	100	12,228	5.2
Minnesota	211	9,833	4.2
Iowa	137	6,309	2.7
Tennessee	220	6,108	2.6
Illinois	231	5,097	2.1
All other states	1,000	19,668	8.3

The wide range of elm is evident from the fact that it is reported from 35 states, 10 of which lie west of the Mississippi River. More than half, however, comes from three states—Wisconsin, Michigan, and Ohio. The statistics indicate that the production of elm lumber has passed its maximum and is declining. The output was little more than half as much in 1911 as in 1899. Wisconsin has been for several years a larger producer of elm than any other state.

PHILIPPINE HARD WOODS

A great deal has been heard but little known on this side of the world of the rare and beautiful hard woods of the Philippine Islands and some of the stories told may have suggested that the imagination had not been neglected, but a practical demonstration that these stories were founded on fact may be found in the offices of General Frank McIntyre, chief of the Bureau of Insular Affairs, where there has just been received from the islands enough furniture to furnish two office rooms. Many persons have called out of mingled interest and curiosity and have critically examined this furniture in admiration that could not be suppressed.

About a year ago, as the story goes, it occurred to the Insular Bureau, which has charge of the affairs of civil government in the Philippines, etc., that it would be a good idea to have in Washington, for the inspection of visitors and others interested in our far away islands an exhibit of one of their valuable resources. This idea prompted the thought that the exhibit might be made useful as well as ornamental and it was therefore decided to have made in the Philippine Islands, out of the native hard woods and by native workmen, enough furniture for the rooms in the War Department building occupied by the chief of the Bureau of Insular Affairs to show the possibilities as well as the beautiful color and grain of the Philippine hard woods.

The Governor General of the islands was consulted and gave his prompt and hearty approval and the action necessary to put the thought into effect was taken at once.

As a relic of Spanish times all the woods in the Philippines are divided by law into four groups. The grouping has been slightly changed since American occupation, but it still fairly represents the preference of timber users. Narra is always placed in the first, or highest, group in the classification of the woods of the islands and is of a singularly rich and beautiful color.

Narra is among the very highest priced woods because of its beautiful color, durability and adaptability. The Philippines produce harder and better woods for exterior work but they do not furnish anything superior for interior decoration or furniture. The wood of narra is moderately heavy, moderately hard, very durable, and is seldom, if ever, attacked by the anay (white ant). It seasons well when properly treated and takes a fine finish. The heartwood of narra is white, yellow or red,

and the sapwood nearly white. The grain is rather fine, but irregular, and very beautiful when quarter sawn.

Narra is divided commercially into two varieties, called read and yellow. So far as is known this division is not a specific one, but a difference due to the habitat in which the tree grows. Both species have the red and yellow varieties. The red grows in the hilly country, near the streams generally, and the yellow is found in the flats near the seacoast.

Slabs are obtained from the buttresses of narra, from which large one-piece table tops are made. These are sometimes six feet and over in diameter. Narra wood is often finished in its natural color and sometimes stained brown or dark red.

This class of wood, formerly very popular for pianos and high grade furniture, is becoming very scarce on this side of the world and is much imitated by stains or veneers. It is not generally known that there is almost an inexhaustible supply under the jurisdiction of this government on which no import duty need be paid.

It has been estimated that there are as high as 40,000,000 acres of public forest lands in the Philippines Island. The Director of Forestry says in a report:

"In a recent visit to the southern islands of this group I was impressed with the amount of timber standing on the smaller islands; frequently the topography was such that it could be exploited with facility. I saw tracts of virgin forest where more than 10,000 cubic feet of magnificent timber per acre was standing; trees 150 feet in height, with trunks clear of branches for 80 feet. There are many millions of cubic feet of timber in these forests that should be cut in order to properly thin out the dense growth; for instance, where there are three or four trees growing on a space required for one, that one so freed would put on more good wood each year than the four together.

"It is safe to state that the number of native tree species found will be nearer 500 than 450, a great majority of these undoubtedly being hard woods. The edges of the great forests have been scarcely cut away and 50 valuable hard woods given to the world, the full value of which species has not been demonstrated as yet; 665 native tree species are now listed."

Some idea of the present and potential value of the islands in hard wood alone may be gained from the bare statement that there is enough hard wood standing in the virgin forests of the islands several times over to pay for their original cost to the United States even if sold at only a nominal price per acre.

HOW THE BODY GOES TO THE TRIMMER

In some shops it is customary to send bodies to the trimmers in the grey, in others just before the rubbing varnish stage and in others again at the conclusion of that stage. The most common custom is perhaps to send them after the first coat of rubbing varnish has been put on. There is something to be said in favor of each. If the trimming goes ahead of the varnishing there is more danger of it being damaged by the painter, whereas if the painter's work is in advance he generally finds cause for complaint against the trimmer. These points are trivial compared with the maintenance of some definite system suitable to the circumstances of the works. If a job can be handed over to the trimmers after the second coat of rubbing varnish has been applied but before it is flatted, it gives the varnish a good chance to dry and harden thoroughly, which is a good point.

WOOD OR IRON

In building carriage or motor bodies we use for those parts that have to stand any considerable strain, either iron or steel or timber, and these two—iron and timber—differ as to weight, strength, stiffness and the effect of the weather upon them. As the simplest example of the difference in strength and weight, take a straight pull. Iron will bear 20 to 22 tons, say, 21 tons, before you can pull in two a bar 1 inch square; an ash bar of the same size, that is 1 inch square, would bear from 6 to 8 tons, say, 7 tons, so that wooden bar is one-third the strength of the iron, and a wooden bar 2 inches by 1½ inches (or any bar that was 3 inches square in section) would bear the same tensile strain as the bar of 1 inch square iron; but the iron would be very much heavier; a bar of iron 1 foot long by 1 inch by 1 inch weighs 3 bls. 5½ ozs., and a bar of wood 1 foot by 2 inches by 1½ inches weighs about 15 ozs.

PRACTICE DRAWING

It is amusing at times to see a man who is not used to sketching, trying to describe by means of a rough sketch, some object or vehicle he may have seen, or has in mind. He finds it quite impossible to get the effect he wishes to convey. Whereas to a man who has had a little practice it seems as easy as talking. It is the best way of taking down dimensions, and there is less likelihood of a measurement being overlooked.

Make a rough sketch and mark the sizes on it.

SCREWS WITH SQUARED POINTS

It is usual to secure hub bands on larger wheels by putting a screw through the band on each side. Very few take the trouble to bore the hole in the wood for the screw and drive them in properly with a screw driver. They are more often whacked in with a hammer without even boring the holes. You cannot drive a screw properly with a hammer as it will bend or the head will break off. But if you square the thread part of the screw with a file or on the emery stone, or even with a hammer on the anvil, they will drive with a hammer like a spike, and hold in the wood almost as well as those put in properly.

AS IT SHOULD BE

In an increase in timber sales this year and in a decrease in receipts from timber trespass as compared with last year, national forest officers see a growing use of the forests and respect for the federal forest policy.

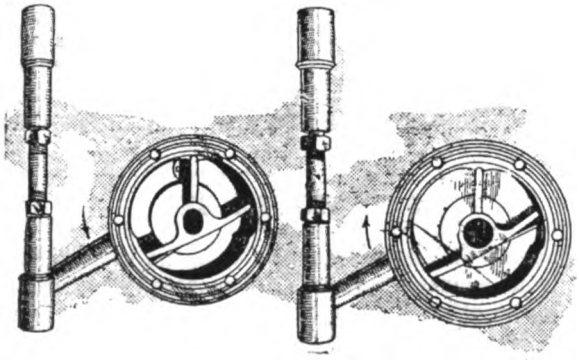
THE DERIHON, A NEW FRENCH SHOCK ABSORBER

In Europe alone during the past six years or so no fewer than some 5,000 or 6,000 patents have been taken out on shock absorbers, while the extraordinary number of something approaching 500 types are at present marketed. The Derihon shock absorber is different in construction from the ordinary type.

The shock absorber under consideration sets out upon an endeavor to accomplish the apparently impossible, and is so designed as to allow the suspension spring free movement upward or downward from its normal position, and to check it upon the return movement which follows either of these displacements of the main spring. The construction of the absorber may be gathered from the illustration. It will be seen that the actual casing of the apparatus is attached to the chassis by two bolts, and centrally mounted on the said casing, carried on a hardened steel spindle, there is what one might term a twin part-rotatable paddle. The casing is filled up with oil, and the internal bore of the casing has two diameters, as the main idea underlying the operations is that the follower paddle, which is narrower than the other one (mounted on the same spindle) allows oil to pass between it and the other member. The major movable paddle is arranged to allow either the free passage of the liquid between the blades or automatically to obstruct the passage of it, and is provided with two little stops to limit the relative angle. Looking at

the sketch it is seen that as the spring jumps up, taking with it the attachment level of the shock absorber, the main paddle is moved up bodily, and the twin paddle, having a slight relative motion to the other one in its initial movement in trying to compress the liquid, is forced backward a trifle, thus bringing into being the space between the two blades, through which the oil can quickly pass, and the spring thus have its free movement. That is to say, that the liquid can pass in a more or less unrestricted manner from one compartment to another through the opening between the two blades. On the other hand, when it has to return after the compression of the spring, the liquid is compressed into the right-hand compartment, having to force its way through the small passage way allowed in the central partition wall. The actual working of the shock absorber, then, can be described as follows: The paddle to which the oscillations are transmitted through the medium of the connecting lever operates within a pressure-tight cylinder filled with some suitable liquid, such as, for example, oil. Vertically positioned with the lower part of the casing is a partition wall, and in conjunction with this the paddle blades in question divide the casing into three compartments. The oscillations of the paddle due to the vertical movement of the main spring consequently vary the respective volumes admitted to the right or the left of the fixed partition wall, while the volume above the paddles is more or less constant.

It has been previously mentioned that the casing in question has a dual-diameter bore, the one being in the same diameter



as the paddle blades, while the lower diameter is slightly larger. Consequently, as soon as the spring rises or falls from its normal position, either the one side of the paddle or the other leaves the small bore position to take up its fresh place within the large diameter. The one which so acts offers what may be termed no resistance to the free movement of oil, the actual work of shock absorbing being left to that half of the paddle which is within the fitting part of the casing. It is, of course, obvious that as the spring is compressed or expanded, so the one or the other does the work. So soon as the compression of the spring forces up the lever, one of the blades moves toward the top of the chamber, while the other one goes downward and enters the larger bore, so that it offers no resistance to the passage of oil. With regard to the upper blade, no resistance is likewise offered here, as, owing to the difference of the angles of the blades, the oil passes between them. Thus, then, is the first desideratum of a good shock absorber fulfilled. In the return movement, however, the opening between the two blades on the upper portion of the chamber is instantaneously and automatically closed, and the oil behind this blade is forced through from the one compartment to the other, the resistance varying according to the adjustment of the slot in the partition wall. It is thus seen, therefore, that we have now obtained the free movement of the spring and its necessary checking on its return to a normal position when the same has been caused by a positive defect in the road surface. It is fairly easy to see that a similar state of affairs takes place during an expansion of the spring, although in this case the action is naturally reversed.

It is seen, therefore, that the actual action of the Derihon shock absorber is more in the direction of a dual-oscillation snubber, as in either direction it allows the free deformation of the spring, but instead of allowing the spring then to dither, the snubbing action comes in to prevent the subsequent oscillations.

BUSINESS PHILOSOPHY BY SEC'Y REDFIELD

The Real Government Brand

Never give up self-study. There will always be something to learn about your ways.

Don't let your initiative become sterilized by a tariff or anything else. (This may be—as a friend says it is—"grossly inferential," but it is true nevertheless.)

It is not wise to destroy the initiative of your working force by looking so hard at a quarter yourself that you can't see the five dollar bill beyond.

A justly discontented force can cost you more directly and indirectly than the most expert and costly supervision can ever find out.

The cheapest and most efficient discipline is that which well-paid, hopeful, and zealous work naturally creates.

The cutting of piecework rates and wages is the hallmark of inefficient management.

Obsolete machinery is the foe of profits, the brother of high cost, and the friend of bad methods.

Export trade begins at home, in your own shop, and first with the head of it. To get it, bring your wages and output up—your cost and prices down; know what is doing in your own plant and you can smile at a competing world.

When you have good stuff to sell, well and cheaply made, properly designed, and of regular quality, well packed, you will have no trouble to sell it abroad. What one country or market won't take, another will. It's a large world.

BEST FOR LONG JAUNTS

A seller of cars, interviewed by an exchange, clearly points out what has always seemed to us the only strong point of the motor car. Practical experience of those who have to market the product seems to confirm our view. This man says:

"I believe that if the manufacturers would consider this point (touring), their new features would be more in line for comfort during long rides.

"As an example, we have been using as a strong talking point the fact that our brake drums and strength of frame is unusual for a car selling at our price. This insures safety on grades and steep roads while touring. We are now using extra wide and flexible springs, which insure riding in comfort over the rough roads which one is bound to encounter. Our cushions, which are fourteen inches deep, are somewhat in excess of the average cushion in an automobile, but we believe that their comfort will be thoroughly enjoyed on long tours, for no matter how attractive the scenery may be, if the automobile is not comfortable the journey will not be as thoroughly enjoyed as it should be.

"I believe that you will agree with me that nine out of every ten automobiles sold show a greater out-of-town or touring mileage than in town."

A SPRING LUBRICANT

A lasting anti-rust lubricant for the leaves of axle springs that has been found exceptionally good may be made by heating and blending 1 lb. of old India rubber, ½ lb. of grease, and ½ lb. of graphite. This recipe has been in use for many years among automobile repairers.

Paint Shop

PAINTING WIRE WHEELS OF MOTORS

To paint and varnish this class of wheel to a good finish requires patience and time. Although not much to look at, one of these wheels will take considerably more time to coat than an ordinary buggy wheel, and under the most favorable conditions it is difficult to turn out a satisfactory job. The question arises, "Why not dip the rim in the same manner as an enameller does with a bicycle?"

That this can be carried out successfully without any additional outlay the writer will endeavor to show, says C. S. J., in Australasian Coachbulider; in fact, it should be done at a reduced cost as compared with ordinary brush work. We will take it the wheels are thoroughly clean and smooth, ready for the first coat of lead. Mix this latter in equal parts gold size and varnish into a thick paste. Run through the mill or strain through fine muslin, and thin down to a very thin consistency with turps.

The next item is the dipping utensil. This is easily made by cutting out one side of a half gallon tin. Have this securely fixed, so that with the wheel spinning on the horse the rim will run inside the tin. On some cars the wheels will have to be finished on its own axle. Now proceed to coat up the wheel as follows: First coat up the hub. Apply the paint thin, taking particular care that you do about an inch of the spokes at the same time; this does away with the necessity of touching the hub later on.

Now place the dipping pan in position, so that the rim runs true. Pour in sufficient color to cover the rim. A fair guide would be to have sufficient paint in the vessel to cover about an inch of the spokes; and, during this operation, see to it that the supply is kept up. The rim is now in position and the lower portion covered with the paint. Now take a small camel brush and proceed to coat the spokes. You have now painted three spokes; turn the wheel round and do the next three spokes. You will now notice a small portion of the rim has been coated, and while you are coating up the second lot of spokes the paint on that portion of the rim coated will flow out smooth; that is, providing your paint is of the right consistency. This can only be found out by personal experience.

Carry out this operation of coating up the spokes piece by piece, and the rim will look after itself. Don't let your rim go back into the paint after once leaving the vessel.

At the final you may find the paint has set where the operation was started. This may be levelled down by running the brush over the lap. At this stage it is advisable to take a bristle brush and wipe up the outer groove of rim, this being the place where the paint is more likely to accumulate. Keep the wheel swinging for a few minutes, when it may be set aside to dry.

In applying quick color have the color very thin. Coat the hub and spokes first, then run the rim through the liquid last. Clean up the outside of rim and keep the wheel on the spin until set.

For varnish color, mix the ingredients in equal parts gold size and varnish (this must be a varnish that will not bead), add a very small portion turps, and apply as follows: First coat up the hub; next dip the rim and lift up the wheel or remove the dipping pan. You now have the spokes to coat up, and this will take from ten minutes upward. During this time the wheel is kept in motion, which prevents the varnish color from running, and by the time the spokes are finished your rim will be set, providing this formula is followed.

The final coat of varnish should consist of a hard drying varnish, same as used for varnish color, and the wheel should be handled in the same manner; but it is advisable to keep the wheel spinning for a considerable time. This will not entail any extra time, as the wheel may be kept on the move while coating the next. Should there be any flows in this varnish coat they will by repeated spinning flow out fairly even, and by using the right brand, even in the case of a bad flow, it will not sag or crinkle.

To coat up a rim will take on the average ten minutes; but by dipping, which is done while you are coating up the spokes, it costs nothing for labor, with this added advantage, the paint or varnish is applied more evenly and the finish is cleaner. Some may be dubious as to an air drying paint running or flowing level. It is only a matter of using the proper ingredients. They can be done in a shorter time, and, if anything, this process will give a cleaner finish.

To illustrate how to get the various colors the desired consistency, mix the colors as directed. Have a small tin three or four inches deep; fill this with the paint and drop an old spoke into the mass. Now draw this upward gently at the rate of one inch a minute, and you will find the coating will flow out uniform. The liquid drains off slowly by natural cases, and this draining operation is about equal to an inch a minute. But in doing rims there is a much longer time allowed, which is all the more favorable to dipping method as applied to rims.

PAINT AND VARNISH INDUSTRY (1909) IN THE CENSUS

Statistics of the paint and varnish industry in the United States for 1909 are presented in detail in a bulletin soon to be issued by Director Harris of the Bureau of the Census, Department of Commerce.

The statistics of the paint and varnish industry cover the returns of two classes of establishments (1) those engaged primarily in the manufacture of pigments or paints, and (2) those engaged primarily in the manufacture of varnishes, japans, lacquers, or fillers. Linseed oil manufactured for use within the producing establishments of the second class—varnishes, shellacs, japans and lacquers—are mainly solutions of gums, resins, asphaltum, or other ingredients in such solvents or vehicles as turpentine, linseed oil, alcohol, naphtha, benzine, etc.

Of the 791 establishments in the industry as a whole in 1909, about three-fourths (588) manufactured paints as products of chief value, and these reported approximately three-fourths of the value of products, five-sixths of the number of wage earners, and four-fifths of the amount paid for wages and the cost of materials.

The establishments in the industry as a whole gave employment to an average of 21,896 persons, of whom 14,240 were wage earners, and paid out $18,649,074 in salaries and wages.

The cost of materials used in the industry in 1909 was $79,015,555, or more than three-fifths (63.3 per cent.) of the total value of products, which was $124,889,422, and the value added by manufacture (that is, the value of products less the cost of materials) was $45,873,867.

The value of products increased $55,327,187, or 79.5 per cent, during the decade 1899-1909, being almost six times as great in 1909 as in 1869. The largest relative increase in value of

products during any decade was that during the period 1879-1889, 86.3 per cent., but the rate of increase for the decade 1899-1909 was also high, 79.5 per cent., and in absolute amount the increase for the latter period was more than twice that for the former period. Increases in all items are shown for each census period.

New York State First

New York ranked first at the censuses of 1909 and 1904 in average number of wage earners, value of products, and value added by manufacture. In average number of wage earners Pennsylvania held second place at both censuses, but in value of products and value added by manufacture Illinois was second. The highest percentages of increase for the decade as a whole which are shown for any of the ten leading states are those for California, but for the five-year period 1904-1909 Michigan shows the highest rate of increase in wage earners, Kentucky in value of products, and Ohio in value added by manufacture.

The most important distinction shown is that between corporate and all other forms of ownership. Of the total number of establishments reported for the industry in 1909, 66.5 per cent. were under corporate ownership. The corresponding figure for 1904 was 56.3 per cent. The value of the products of the establishments under corporate ownership represented 85.2 per cent. of the total value of products for all establishments engaged in the industry in 1909 and 83.1 per cent. in 1904.

Materials and Products

The cost of all materials used in the combined industry was $79,016,000 in 1909, $59,827,000 in 1904, and $44,739,000 in 1899, the increase for the decade 1899-1909 being 76.6 per cent.

During the period 1899-1909 the value of all products of the industry increased from $69,562,235 to $124,889,422, or 79.5 per cent., the rate of increase for the first half of the decade being 30.6 per cent., and that for the last half 37.5 per cent. The value of pigments and paints produced in 1909 was $73,748,884, representing an increase of 61.1 per cent. as compared with the figures for 1899 ($45,785,072), while the relative increase in value for varnishes and japans during the decade was 69 per cent.

The production of lamp black and other blacks by factories in the paint and varnish industry (1,811,445 pounds, valued at $105,174 in 1909) forms only a small part of the total output of such pigments. In 1909 there were 27 establishments engaged primarily in the manufacture of "bone, carbon, and lamp black," with products having a total value of $1,093,494, including specified subsidiary products other than blacks to the value of $21,000. In addition, black pigments valued at $961,995 were reported as subsidiary products of establishments in the fertilizer and glue industries. Thus the value of the total production of bone, carbon, and lamp black by all classes of establishments in 1909 was $2,139,663. The quantity was not reported in all cases, but on the basis of the average value per pound (4.66 cents) as computed from the returns of the establishments reporting quantities, the total production is estimated at 45,900,000 pounds.

GLUE TANK THERMOMETER

The question of temperature is the most important of all the items in connection with the handling of glue—in all cases; and yet we find that as a rule the glue user pays only scant attention to this item. This is fully recognized if we look into the provisions made for the gauging of the heat in the rooms and in the appliances where glue is used: in the majority of cases there is no thermometer in sight; or if there is one it is the cheapest kind of thing, and it was never tested.

For the gauging of water, steam, electricity, gas or even compressed air there are meters and instruments galore and their accuracy is verified from time to time, because the advantage of doing that has been experienced. And now when we have the plain figures telling us that the control of heat applied to glue means smaller glue bills and better glue work the time has come for providing the glue room with the necessary "heatmeters."

The glue liquid in the inner tank receives its heat from contact with the water jacket around it; if we control the heat of this jacket we control the heat of the glue liquid. The bulb of the thermometer should be placed so that it gauges the heat of the jacket and the position should be either midway between bottom and overflow or so chosen that the bulb is not influenced by the steam from the steam jet heating the tank.

The instrument should have a good sized case and scale, not smaller than nine inches and preferably larger, with graduation spaces wide enough apart to permit easy reading of single degrees F. Glass covering is desirable to protect tube and scale. Graduation should be from 90 to 200 deg. F. and with expansion chamber at upper end of mercury tube. Good size means plain reading—and no fuss or guesswork or use of matches if the heat shall be found out; with a good sized case and big scale the heat is always plainly indicated—and that is what is wanted.

In a thermometer designed for industrial applications, such as a thermometer for attachment to a glue heater, there are three points to be considered if such thermometer is to give dependable indications. Of course the thermometer must be provided with a scale which will show accurate indications. It is not sufficient, however, for the manufacturer to lay out this scale as he would if he had simply the kind of thermometer to make such as a chemist would use in his laboratory, and which would be simply a glass stem with the scale engraved thereon, or a thermometer of the kind that would hang on the wall of a room.

The metal parts which are necessary to protect the glass tube of an industrial thermometer serve as conductors of temperature to or from the glass bulb of the instrument. While such conductor can be overcome to a certain extent by methods which are more or less technical and need not be discussed here, it is physically impossible to entirely overcome such condition. It is therefore necessary for the manufacturer to lay out the scale of the instrument while subjecting the thermometer to the same conditions it will receive when it is later put to actual use.

STUNTS WITH SHELLAC

Pure grain alcohol shellac has a pleasing odor, and does not affect the eyes, and it works freer and sets slower than the wood article. Yet it dries harder than the other, though slower in setting.

Wood alcohol shellac sets so rapidly that it is difficult to make a nice surface with it. It cannot be used at all in French-polishing as it drags badly. Denatured alcohol contains 10 per cent. of wood alcohol, hence is to that extent less desirable than the pure grain article.

One and one-half pounds of best grade brown shellac will, when added to one gallon of 95 per cent. alcohol, make a good bodied shellac varnish. With brown button-lac, which is heavier and contains impurities, it will take two pounds to make a varnish of equal body. To make a white shellac varnish, take two pounds of bleached shellac and three quarts of 95 per cent. grain alcohol. This will give a good bodied varnish. Use the granulated shellac. These varnishes may be thinned.

Use a glue-set bristle brush for applying shellac varnish. Use thin shellac. Two coats are better than one heavy coat. Use steel wool rather than sandpaper for smoothing the surface between coats. Don't touch up any missed places. Do not make any such misses. Keep the surface smooth.

If the shellac coating turns white it is evident that there was

some water in the alcohol. This refers, of course, to brown shellac coatings.

Thin the shellac with pure grain alcohol, preferably, and add a little pure spirits of turpentine.

Filter bleached shellac varnish when made.

The addition of one pound of Venice turpentine to the gallon of shellac cut with wood spirits will make it work much better. About 10 per cent. of Venice turpentine is right, in proportion to the weight of the gum used.

White bleached shellac sometimes deteriorates with age. This is due to the imperfect preparation of the article. In this condition it is stringy and does not readily dissolve in alcohol. The most common method for bleaching shellac is by treating the lac with chloride of lime, bleaching powder, or chlorine gas.

To bleach shellac dissolve in a quart of water two pounds of chloride of lime. Add four ounces of caustic potash dissolved in one pint of water. Place two pounds of shellac in one gallon of grain alcohol and let it stand in warm place for two days. Then add the solution of lime and potash, stirring well, to the alcoholic solution of shellac; in about half an hour add enough hydrochloric acid to precipitate the shellac. Pour off the liquid, and wash the precipitate of shellac in boiling water until it comes off clear, place it on moist board to dry, and it is done.

It is very important that every vestige of the chloride of lime be washed out, or that the acid be sufficient to neutralize the lime. The granulated form of bleached shellac is particularly liable to be affected and to work badly. It is recommended that the bleached shellac be bought in hanks, and be kept under water, changing the water often, and removing any scum that may arise. Or the hanks may be kept in a crate or barrel, with water in the bottom, and with a cover of burlap or other suitable material. How to restore the deteriorated shellac has been told in another place.

When you make shellac varnish, the brown or orange, add a tablespoonful, or about an ounce, of oxalic acid to it, and it will prevent it from turning darker.

To restore the color of a shellacked surface, when made white in spots, try heat. This was accidentally discovered by a workman holding a cigar near a white spot, when it was restored to its original color.

YELLOW PAINTS

The most important yellows are the various brands of ochres, which are found in various parts of the world, the European ochres being of silicious or sandy nature and containing iron, and better adapted to coach painting than other brands of a clayey type, and containing oxide of aluminum. Common paints of this description have little washing and preparation before being packed. The silicate earths are superior, as they have an affinity for the oil they are mixed with, but not for water, so that they are able to dry well and anchor themselves to the porous white lead priming coat underneath.

Medium chrome yellow is the neutral base of all the tints from the palest canary to the warmest orange, and is made by adding white lead to bichromate of potash. Sulphuric acid or sulphate of lead is used in increasing proportions to make the lighter yellows, while the deeper yellows are made by adding an alkali such as caustic soda or potash. The light yellows have, therefore, an acid reaction, and the deep ones an alkaline character, while the middle tone, from which all the shades are produced, is neutral—that is, it betrays neither an acid or alkaline reaction.

These chrome yellows are all very cheap, the ochres, of course, being cheaper still. The most expensive yellow used in the coach trade is cadmium yellow. This is made by using a pure cadmium sulphate or chloride, and precipitating it in the presence of a little free acid by means of a stream of sulphuretted hydrogen. There seems to be little excuse for the use of this expensive color.

Permanent yellow does not blacken on exposure to impure atmospheres. It is apt to become greenish in hue after a time.

Naples yellow is another fairly expensive color, but has no special merit beyond a certain tone. It often consists of a mixture of zinc oxide and cadmium yellow, the true pigment being a compound of oxide of lead, antimony, and zinc. The zinc-cadmium type is the most permanent; it darkens on contact with iron, so that a bone spatula should be used.

Dutch pink, or yellow lake, is a cheap useful color, and is derived from quercitron extracted from oak bark. It is used as a glaze for greens and browns.

Yellows, as with other light colors, require delicate priming coats, and must be protected with a good pale varnish, but most of them fade in course of time.

LEAD POISON

A poison can be introduced into the system in three several ways: By the mouth and stomach, by the nose and lungs, by a cut or open sore in the flesh; but however deadly a material, or one of its constituents, may be, it will not act as a poison unless it is soluble in water or in the natural liquids which exist inside the body. Only gases, vapors, and solid substances which occur in such fine powders as to be practically vapors, can find an entry through the lungs; solids and liquids always pass into the body by the mouth or through wounds.

Lead exhibits two striking peculiarities which render it more than usually insidious. The first depends on the fact that lead is a cumulative poison. If a man inhales a noxious vapor, or swallows a poisonous liquid or solid in amount insufficient to destroy life or even to injure health, the substance is wholly removed from the system—by the kidneys, bowels, or lungs, as the case may be—within a definite period of time; and he may go on taking further doses at frequent intervals without doing himself much permanent harm. Lead, on the other hand, is not completely removed from the system by the natural processes of life; some of it remains behind—it accumulates—until with each successive quantity inhaled or swallowed, the amount gradually becomes sufficient to cause the various symptoms which characterize lead poisoning. For this reason, unless a man habitually exposed to the action of lead is examined periodically, he seldom discovers the approach of plumbism until his body is so nearly saturated that health and strength have already begun to suffer. The second peculiarity about lead is that although its compounds used in the arts are solid bodies, the most common compound, white lead, is so fine a dust that it ranks as a vapor, and is capable of being inhaled like coal gas or chloroform. Dry white lead can accordingly make its way into the human system through any or all of the above-mentioned apertures, and, therefore, extra care has to be taken in dealing with it.

ORIGINAL METHOD OF REPRODUCTION OF ORNAMENT

The systems of tracing and pouncing for the repetition of ornament have been in vogue for many years. The method of duplicating hereafter described has the advantage of being clean and quick, providing that the color of the surface presented is not too deep to allow the outline to be followed: Moreover, the resulting outline is firm and indelible, rendering it highly suitable for the use of designers and saving many hours of monotonous tracing. So far as I am aware, writes J. Lawrence, in The Decorator, the method is original though the principle involved is just as old as the "Hectograph." Proceed as follows:

Obtain first a few transparent celluloid sheets one-fiftieth of an inch in thickness. These sheets are made 34 x 48 in. One sheet could be cut up to form a useful set of sheets varying

in size. A useful set for the usual requirements could be made by first cutting the full sheet in halves, then dividing one half, giving two quarter sheets, and finally dividing one of the quarters. This gives a set consisting of two one-eighth sheets, one quarter sheet, and one half sheet. Other sizes could be made to special purposes.

A gelatine mixture is prepared as follows: One ounce of gelatine is soaked for 24 hours in four ounces of water and then heated in the inner vessel of a double pot, water being placed in the outer vessel. The whole is placed over a slow fire. (A glue pot answers the purpose.) When melted, six ounces of glycerine are added and two ounces of fine sugar; all the ingredients being measured by weight. The mixture should be allowed to get fairly hot; but should on on account be boiled. The celluloid sheets are now coated on one side with the hot mixture; but should be well glass papered with No. 1 paper before the operation so that the film will thoroughly adhere. The best tool for this purpose is a wide flat camel hair brush. The coating must be laid on quickly as the cold surface rapidly congeals the gelatine. The sheets can be warmed to facilitate matters, but great care should be exercised as the sheets are highly inflammable. Dipping in hot water and drying is the safest method of doing this. Very little practice will ensure success in coating the sheets. They should now be allowed to set in a cool place and are then ready for use. The manner of using these sheets is as follows:

A tracing of the original design is taken on ordinary tracing paper, using a mapping pen and diluted hectograph ink for the purpose. It must be weakened with about six parts of water. When the tracing is dry it is laid, face downwards, on the prepared surface of one of the transparent sheets and well rubbed to the surface. After leaving in contact for one minute, the tracing paper is removed, leaving an impression on the celluloid sheet.

MOISTURE PROOFING

Waterproofing paper is simply filling the fibres of the stock with an insoluble size, such as aluminum silicate produces by silicate of soda and alum.

The more silicate such a sheet can carry, the more nearly will it be waterproof. But the great difficulty in indefinitely increasing the percentage of silicate is that there is a tendency toward brittleness.

To avoid this trouble some material must be used to enable the fibres to carry more silicate without breaking. The following formula is said to be a valuable remedy for this difficulty, the ordinary rosin size being partly or wholly replaced by it:

18 lbs. Japan wax.
13.5 lbs. caustic soda liquor (40° Beaume).
22.5 lbs. water (equal 2 2/3 gals.)

Total 54 lbs. white wax soap.

Melt the wax in the kettle with half the water; add the soda slowly; bring to a boil; add the balance of the water. It is possible to replace one-third to one-half of the japan wax with paraffine wax.

MIXING GREENS

There appears to be some difficulty among those not well versed in color mixing in getting light greens, and the practice is sometimes followed of adding white, which is in most cases a decided mistake. Greens, as a rule, are best made from an admixture of a yellow and blue, but the yellow may vary from a light primrose chrome to an ochre, and even when occasion requires a little sienna could be added. Middle chrome added to black gives a very deep green. A pea green—a color, by the by, which is almost always insipid and unsatisfactory—may be obtained by lightening pale Brunswick green with white. Willow green is made from ochre and indigo, olive green from ochre and French ultramarine. Those who wish to follow up the subject by experiments should take various blues and various yellows and mix them together, tabulating the result. Each of the yellows should be mixed in turn with the different blues, using zinc yellow in the case of ultramarine in preference to chrome, which has a tendency to turn black. The study of color mixing is a most interesting one and one that possesses almost a fascination after it has been carried out to any extent. It should be remembered that greens are probably the most popular and satisfactory in interior decoration, and hence a painter should always be in a position to obtain them by mixing in any shade, tint or hue required, at the same time it may often be found cheaper to purchase the particular hue required. Most of the large paint manufacturers send out some very good greens of most pleasing variations in shades, and there is no difficulty also in getting greens which are substantially permanent for outside use, a great improvement having been made in this respect during the last few years.—Decorator.

HOW TO INCREASE VARNISH LUSTRE

Owing to hard usage or knocking about in the repair shop, varnish is dimmed, or the grease and oils have injured it.

In such case, here is a preparation that will help to increase the brightness of the varnish or restore it when faded.

It is a polish of beeswax and gasoline. Place half pine gasoline in a bowl, and dissolve into it enough wax to make the mixture the thickness of thin paint. The wax is dissolved by rubbing it against the surface of a hot sad iron, letting it melt in to the gasoline. Stir often. No danger in this operation if no flame light is near during the operation.

When the car has been washed in the ordinary way, the body work is rubbed over with a cloth dipped in the polish, and after being allowed to dry—the longer the better—is polished with a soft duster. This preparation will be found exceedingly useful for a car body having received oil and grease stains as the result of a visit to the repair shop, for all the grease is removed without any dulling of the varnish; indeed, after polishing up there is a decided increase in the brilliance of the paint work, and the glossy surface is not so liable to retain dust as the plain paint surface. A polish of this nature will retain its lustre for at least a week, and even longer if turpentine is used in place of gasoline. Turpentine, however, has the disadvantage of not being such a quick grease remover. If anything, a car is easier to wash after being polished with beeswax than before, for the water immediately runs off the wax surface. This polish can be used with advantage on leather upholstery without any fear of rendering it sticky.

HEMATITES

All natural red oxides are hematites; the natural brown oxides are usually part hematite and part limonite; the yellow color of all ochres is due to limonite; while umbers and siennas are chiefly limonites with the addition of oxide of manganese. Roasting changes the limonite to hematite, producing respectively red ochres and burnt umbers and siennas.

REPAINTING POLISHED WORK

When work that has been brought up to the natural wood is sent to the shop to be painted in colors, the question very often comes up, and especially when the job is in pretty good condition, why is it necessary to remove all the undercoats before proceeding to paint it? The reason is simply this. The foundation, as given by the natural process, is a very faulty one, because it is based upon the shellac varnish, and is in no sense a fit one for colors mixed with oils.

Smith Shop

LECTURE ON "SPRINGS"

The paper read before the Institution of Automobile Engineers by Mr. G. H. Baillie showed that the author had gone to considerable trouble in making a careful experimental investigation into many of the more or less obscure phenomena which occur in connection with motor car springing. These experiments he carried out with small models to scale, and the results were shown in curves and charts. Many of the results of experiments and the author's conclusions should be of considerable help to those who have to solve problems connected with car springing. In view of the great interest being taken just now in the designing and fitting of shock damping devices of the friction type, we may perhaps with advantage quote the author's views.

The author believes that it is this change of acceleration due to friction which causes the jerk which is felt, and not the change due to the increasing spring pressure. If this view be correct, the all important thing is to diminish the friction as far as possible.

The author has drawn out a curve to show the effect of the progressive friction generally arranged for in shock absorbers, that is to say, friction which increases as the deflection of the spring increases from the normal. The curves of path hardly differ at all from those with constant friction, but the acceleration curve shows higher accelerations and higher changes of acceleration. This is because the progressive friction assumed was such as to represent the same total amount of work done in friction over the deflection given, as in the case of the constant friction of 170 lbs.; the friction, therefore, at the point of maximum acceleration has a much higher value. The effect, then, of progressive friction as compared with constant friction is to increase the jerk for large deflections and to diminish it for quite small deflections when the friction is small.

While on the subject of friction, the author would like to call attention to what appears to be a remarkable inconsistency in ordinary practice. It has generally been held that friction in a spring is to be avoided. The driver is advised to keep the spring leaves well greased. It is said to be of advantage for the spring in its normal condition to be nearly flat, and the author has always supposed that the object of this was to diminish friction, because the motion of the leaves over one another is a minimum for deflections from the flat condition.

The inconsistency may, perhaps, be explained by saying that the friction devices do not introduce sensible friction for small deflections, and merely serve to prevent excessive deflections by damping out the rebound from one deflection, so that the effect of successive obstacles is not cumulative.

This, however, is not altogether a satisfactory reply, because, to be effective in damping out the rebound, the friction must be considerable, even for a moderate deflection. All that can be said is that if, by the use of a friction device, a weaker spring can be employed than would be the case without a friction device, this gives some advantage to compensate for the disadvantage of the friction. One thing is nevertheless clear, namely, that, given a car sold by the maker without a friction device and with a spring of suitable strength, it must be bad to fit it with a friction device and leave the spring unaltered. If the spring is not too weak, its rebounds will not be excessive, and the attempt to diminish them by adding a friction device does not, therefore, give any appreciable advantage to compensate for the disadvantage of the friction.

The conclusion come to by the author is, then, that friction devices of the kinds mentioned, namely, those which give constant friction or friction increasing with the deflection, are bad.

There are, however, two other kinds of friction device, to which this conclusion does not apply. First comes the fluid friction device, which has been put on the market in many forms. This gives friction varying as the square of the velocity, so that when the velocity is very small the friction is negligible, while the friction becomes large only when the velocity is high, that is, only when the car gives a very big swing. Such a friction device will not cause any jerk as the velocity of the car upwards exceeds that of the axle, and therefore avoids the chief objection to friction devices. It also becomes rapidly more effective just as it becomes more needed, that is, as the swing increases, and it should be possible to employ a weaker spring, and trust to the friction device to keep the maximum deflection within proper limits.

The fluid friction device, then, appears to be an excellent thing, and the only trouble about it is that, as far as the author knows, it will not work in practice. The viscosity or internal friction of liquids, which is nearly the same as their friction in passing through a small orifice, rises so rapidly with the temperature that the friction acquires widely different values according to whether the car has been standing or has been running over a bumpy road. The only two liquids the author has heard of as being used are oil and glycerine. The viscosity of glycerine at 26 degrees C. is one-fifth of what it is at 8 degrees C. As the temperature would rise above 26 degrees C. after the shock absorber had done very little work, it is evident that a glycerine-filled device cannot be of any use. Oil is much worse because it freezes solid, and the shock absorber promptly breaks on starting out. The ineptitude of selecting the two substances which show exceptionally large variations of viscosity with temperature is quite remarkable. Mercury would be the best liquid, but its viscosity is only about 1/4000th part of that of glycerine.

A liquid friction device with mercury as the liquid would be quite practicable, and might be of considerable advantage, provided always that both it and the spring were designed together.

The author's views on the effect of auxiliary helical or spiral springs are worth quoting. As the result of experiments with a well known spiral spring device, he concludes:

These auxiliary springs had no apparent effect on the main spring, the frequency remaining the same. The auxiliary springs oscillated in unison with the main spring, and the result was merely that the total oscillation was increased by the amplitude of the auxiliary springs. The range of compression of these springs from normal is only about one inch, so that they have the effect of weakening the spring by 10 to 15 per cent. If a car spring fitted after delivery with one of these is not then too weak, it shows that the maker had made an error in fitting too stiff a spring to the car.

There is, however, one important point to be considered in connection with these auxiliary springs. The spiral spring is practically without friction, and its use gives a means of reducing the friction in leaf springs. Leaf springs are, of course, necessary because there is no other type which is so convenient and which forms so good a means of attaching the frame to the axle. They give the small amount of elasticity in restraining side movement which is, the author feels sure, of great advantage. It may be, however, that a stiffer leaf spring with an auxiliary spiral spring is better than a leaf spring of equiva-

lent strength, because the friction of the combination is less, and also because the frictionless spiral spring may lessen the jerk due to friction. The author has fitted these auxiliary springs to his own car, and has found the springing distinctly improved, but how much of the improvement is due to the more flexible spring combination and how much to lessened friction he is not prepared to say.

CARRYING THE FILE

The most natural movement of the hands and arms in filing is to carry the file in circular lines, the several joints of the limbs being the centers of motion; this movement of a convex file would apparently give a concavity to the work, but the real tendency, especially on narrow work, is the reverse, owing to the work acting as a fulcrum over which the file moves with more or less of a rocking motion, giving an actual convexity to its surface except when in the hands of a skillful operator. The real aim, therefore, should be to cause the file to depart only so much from a true right line as will be necessary to feel that each inch of its stroke is brought into exact contact with the desired portion of the work; and by thus changing the course of the stroke slightly, thereby preventing "grooving," a more even surface results and the work is completed sooner.

The movements here referred to have reference to those in which both hands are used upon flat work, requiring nicety and trueness of finish, and the difficulties to be overcome in producing even a comparatively true flat surface with a file require much practice on the part of the operator.

In filing ovals and irregular forms, the movements, while not considered so difficult or trying, nevertheless require considerable experience and a good eye, so to blend the strokes of the file upon the round or curved surfaces as to give the best effect; the varied nature of the work upon this class of surfaces, though much might be said, prevents any detailed definition as to the movements of the file within the limit of this article.

In point of economy, the pressure on the file should be relieved during the back stroke; this will be apparent to anyone who will examine the formation of the points of the teeth, when it will be seen that the file can only cut during the ordinary or advancing stroke and that equal pressure during the back stroke must be very damaging to the points of the teeth.

STRENGTH OF PERFORATED SOFT STEEL

By a series of tests conducted at the laboratory of the Conservatory of Arts and Trades by C. Birault it has been demonstrated that the tensile strength and elastic limit of perforated soft sheet steel are considerably greater than would be inferred from consideration of the amount of steel removed, and that the relative increase of strength is particularly pronounced when the holes are drilled rather than punched. When the holes are punched to their full size, the results are irregular and uncertain. This is ascribed to the cracked condition of the metal found to exist at the edges of punched holes, due to the forcing and upsetting of the molecular structure by the action of the punch. If punched holes are reamed, removing the torn portions of the metal, the results are found to be the same as in case of drilled perforations. The higher strength is ascribed to the more favorable form given the metal by suitable perforation, the chances for yielding and temporary deformation under stresses being improved. In one of the series of tests the ultimate strength of bars with drilled holes average an increase of 12.3 per cent. and the elastic limit 9.2 per cent., while the punched bars showed an increase of elastic limit of 13.5 per cent. but, on the other hand, an 8 per cent. reduction of the ultimate strength. The drilled perforations were ovalized by the pull of the testing machine and parted on middle lines of the holes, while the punched holes remained round and showed irregular lines of fracture. As in the latter cases the elastic limit and the ultimate strength almost coincided this was an effect to be expected.

One of the conclusions drawn from the tests was that the reaming of punched rivet holes in automobile frames and similar construction material should never be omitted, some of the figures obtained by the tests showing that rupture may occur at the original elastic limit of the material. The details of the tests are presented in Le Genie Civil, July 19.

VALUES AND PRICES OF HIGH-SPEED STEELS

From about 400 searching and impartial tests of high-speed steels conducted at the Royal Prussian Institution for Testing of Materials at Gross-Lichterfelde, with a view to the settling of technical opinion in a field where the facts have become obscured through the intensity and variety of the competition, it has been shown that the great majority of high-speed steels do not differ materially in working capacity or intrinsic value but that there is a small class of steels, comprising mostly English and one Austrian variety, in which the efficiency is considerably higher and that finally there is a series of steels known as kobalt steels and manufactured both in England and in Germany which decidedly top the list with regard to working capacity, this term relating to the amount of work done with one sharpening. Among these kobalt steels there was no great difference, so far as the turning of chrome-nickel steel was concerned, but some of them, and one English steel especially, showed considerable superiority for turning cast iron. Many of the details are presented in an article by Professor Schlesinger in Stahl and Eisen for June 5.

A scale of economical values may be established by dividing the figure indicating the mechanical efficiency by that of the market price. When this is done, it is shown that neither is the cheapest steel the most economical nor the highest priced steel the best. The former costs 3.50 mark and the latter 13.50 mark per kilogram (about 40 cents and $1.53 per pound). And the kobalt steels, containing about 5 per cent. of kobalt, make the best economical showing of all, because they combine great durability—wearing qualities of the cutting edge—with a relatively low market price.—From Werkstattstechnik, July 15.

STEEL BODY CONSTRUCTION

In the construction of automobile bodies in sheet steel the following points which deal chiefly with the method of joining up the panels should be taken into consideration:

First it is desirable that the form of the curved panels is such that the beating necessary to shape them is reduced to a minimum. It should also be the aim of the designer to have as few joints as possible.

Where joints occur on the side of the body under the doorways and the length is not enough to render the joint conspicuous a satisfactory method of joining, so long as there is a solid framing underneath, is to simply butt the edges together, fasten down with screws and file off smooth.

In case of there not being solid framing to hold the screws, a piece of metal should be placed at the back of the joint and the whole soldered together. It is not practicable to make a long joint in this manner as the metal would buckle out of shape because of the heat applied.

The most suitable metal to use for the panels is soft stamping stock steel, and 22 B. & S. gauge is the best for general purposes. In cutting out, the best plan is to make paper patterns of thick paper by marking off from the framing. These paper templets are laid on the steel sheets, and by cutting up in this manner there is practically no waste.

After the panels are cut from the sheet, they are made to fit the framing, either by sending through the rolls, or beating by hand or power until the panel lays on the framework, without bulges to destroy the surface of the body. Having shaped

the panel, the edges are then fastened with wood screws, and when filed and sanded off, the moldings are applied to cover the screw heads. Aluminum moldings are advised as they can be easily shaped and nailed down.—The Automobile.

AUTO HINTS FOR CARRIAGE SMITH

Be careful in tightening up bolts, nuts, studs and spark plugs never to run them up too tight. Just enough is just right—too much is too tight.

When placing a jack under a car be careful to get the head of the jack under a part of the car that can stand the strain. Don't attempt to lift the car by the truss rod or some part of the steering gear. In this connection let me warn against the purchase of cheap cast-iron jacks. They are easily broken, and may break some day when your life is depending on them.

A thick, soft brush such as painters use is an excellent means of dislodging dust and dirt from the engine and some other parts of the car mechanism. Cotton waste is very ineffective among the pins and small projections of a motor, while the brush will do the work efficiently and save much bad language.

When cleaning up the points of spark plugs don't attempt to scrape them clean. Use an old stiff tooth brush, well saturated with gasoline.

When bolting down a cylinder, or any other part secured by more than one bolt, do not tighten one nut at a time, but give each nut a turn in time until all are snug.

Asked what was the first and greatest requirement in a general smith when starting to handle auto repairing, a prominent automobile engineer said: "Common horse sesne—it will go farther toward properly equipping him for automobile work than any one other thing. In fact, common horse sense coupled with the smith's natural mechanical ability makes him a better automobile mechanic than many of the so-called experts."

WAXING A BROKEN GEAR

The small gears around woodworking machines frequently become so badly worn that they must be replaced by new castings.

When a gear is merely broken and is in otherwise good condition, it may be taken to the foundry, placed in the sand and a pretty good gear casting made from it. But with a gear that is badly worn conditions are different and some other course must be taken.

Take, for instance, a small pinion 3 inches in diameter, teeth about ½ inch in thickness, and worn half way on one side only. There is not a molder in existence who can make a good casting from such a gear, but there is a way by which the woodworker may obtain a first class casting from such a worn out pinion.

The method is to procure some beeswax and warm the gear to about 80 or 90 degrees Fahr. Then with a candle or a small lamp melt some of the wax, and with a putty knife or some other suitable tool, press the softened wax into the worn parts of the gear teeth. After a little effort in this direction, the gear teeth may be easily and quickly built up to their original shape and condition. If the shape is not quite correct, then melt on a little more wax or trim off a little with a sharp knife as conditions may require. It is a pretty easy job to build up a small gear in this way, and as worn gears are nearly always small ones, it is not a great task to patch up a gear with wax.

SUPPLY OF IRON ORE

The supply of iron ore available under present methods of mining in the entire world has been stated by geologists of international reputation at 22,000,000,000 tons, from which it is estimated 10,000,000,000 tons of iron may be produced. At the present rate of consumption, this supply would last the world about 60 years. There are, however, more than 123,000,000,000 tons of ore not now commercially available, which, with improved methods of production, may be made to yield in the future an additional 53,000,000,000 tons of iron, which would run the world along for another 300 years, if no more iron were used annually than at present.

BREAKAGE OF TOOL STEEL BUSHINGS

A great many tool steel bushings break when driving or pressing into the jig after hardening. Carbonized bushings would do away with this and be a great saving to the firm in the end of a busy season's run. Forming dies of all kinds used in punch press work should be made from low carbon steel and carbonized. In fact, a saving of a great many dollars could be made if a little judgment were used regarding the class of steel used in all the parts in a large factory. If the same carelessness were manifest in the construction of the first class automobile as there is in the tools and fixtures of the factory, the auto would soon go to pieces.

SELECT STEEL WITH CARE

A punch and die should not be made from 110-point carbon steel any more than a finishing lathe tool should be made from 40-point carbon steel. A great deal of the trouble sometimes arises in the stock department. For instance, the steel is unloaded in the receiving department, and is consigned to the stock department where the saws are located, and any department in the plant wanting some steel for a certain job will send an order to the fellow of the steel department like the following: "Cut off two pieces of 2½-round, T. S., 10-inch long." Now, if the steel fellow is not pretty sharp, he will make a mistake, and, still, he is not to blame if there is no system to his department.

A NEW FIFTH WHEEL

Application has been made in the United States for a patent on a new type of fifth wheel, which is said to have considerable vogue in Europe. The inventor is a Frenchman. The fifth wheel is in the form of two segment members in light, and two complete ring members in heavy vehicles, sliding one on the other, the lower member being grooved or slotted in such a way as to allow a corresponding T-shaped flange on the upper member to turn within the groove. The secure holding of the two members together does away with the use of the kingbolt entirely. It is easily adjusted in position at an angle of 180 degrees, but not otherwise.

FILLING HOLES IN CASTINGS

Defects in castings may be filled with a paste made of 2 lbs. of iron borings, 1¼ lbs. of dextrine and ¾ lb. of litharge, the whole mixture being colored with lamp black to the desired shade. The iron borings should be sifted. After the parts are thoroughly mixed, add enough water to make a paste. This is applied to the defects and blow-holes with a putty knife. When the paste has dried thoroughly, it can be machined just as the metal.

MAKING ARBORS

Arbors of all kinds and sizes should be made from 15 carbon open hearth steel. After turning almost to size, leaving just stock for grinding, they can be carbonized and hardened. If they warp in hardening they can be easily straightened, while if made from high carbon tool steel they are liable to break in straightening, and are altogether too costly in these days of successful casehardening.

THE RECLINING SEAT

To be in the fashion is, to many persons, of much more importance than to be at ease, and there are those who would rather be out of the world than appear to be singular in their habits or preferences. The motorist has not been altogether free from the influence of fashion, and many devices and arrangements of great advantage have been distorted and abused because they have been associated with what has been a passing fancy. Among these, the low reclining seat has its votaries, and it is considered to be rather "the thing" to be in a motor car in which it is impossible to maintain an upright seat.

The reclining seat requires room for its full development, and, if it is necessary, there must be just the correct angles at which the occupant will be in a comfortable position thoroughly to enjoy a long ride without after fatigue sometimes reaching nausea. The pace of a car—20 miles per hour—is sufficient to cause some discomfort if the local conditions are not suited to the passenger, and the reclining seat is more frequently unsuitable than a more upright position would be under these circumstances. The library chair or drawing room couch is not occupied for a whole day, and the inferences drawn from the restful position when stationary are not applicable to a seat which is constantly moving about under the occupant. The problem of providing a really comfortable seat has to be considered bearing in mind two factors—the arrangement of the chassis load on the two axles and the disposition of the seating accommodation on the chassis frame, and the actual upholstery of the seating. The occupants of the front seats, being in the center of the suspension, are not affected in the same manner as are those on the rear seats, and what is not uncomfortable for them may cause the greatest discomfort to the others. In the perfectly suspended carriage the whole of the load rises and falls evenly on the ordinary inequalities of the road, except when some sudden depression checks the motion and jars the occupants; and there is an absence of that bellows-like action so frequently met with on the rear seat of cars which are not perfectly suspended.

It is possible to have perfectly comfortable seating for four persons within a space of 7 ft. 6 in. from the dashboard, with cushions of sufficient depth and thickness. The short body, for some reason, has always been classed as uncomfortable. Some short bodies may have been ill-made and worse upholstered in the past. It has been assumed that, because one was bad, so must all others that appeared to be like the ill-made one. With the short body, the rear axle could be brought so far from the front that it would be in line with the rear of the body, the correct position for it, and even if the chassis suspension was not perfect the disturbance to the passengers would not be so great or wearying, because the position of the seat would be less affected by the bellows-like action.

With reclining seats properly made to be comfortable, writes G. W., in The Motor, more space is required, nearly 10 feet being occupied by the body of a car to carry four passengers only. It is in this case that the combination of perfect suspension on the chassis and perfect upholstery in the car gives comfort to the occupant. Where there is sufficient length given to the couch-like seat and the upholstery springs are just in the right place, the occupant finds a comfortable and restful position so long as the car remains standing or proceeding at a very slow pace, much below the town speed limit.

With cars required to carry six or seven passengers, it is not possible to give up so much space to the reclining seat, the more upright seat has to be adopted, and the upholstery arranged accordingly. There is a medium position which can be given, and when the suspension of the car is adjusted to suit the disposition of the load, comfort can be attained in all of the seats available. The suspension of the chassis is the most important point in attaining comfortable seating. This must be made so that it is suitable for the disposition of the load which is to be placed upon it, and there is a large field for improvement in this respect. Those more immediately interested in obtaining a comfortable seat often conclude that, because the seating is such that the occupant sinks deep into the cushion, the result will be no fatigue from the long journey. It does not follow. The very ease with which the cushions yield may aggravate the effect of the unequal suspension, and the occupant be tossed up and down. An attempt is sometimes made to give a full reclining seat to the front, and to leave the four or five persons for whom seats are provided in the interior of the car to the mercy of the unknown. Lack of sufficient space prevents any one of the seats being usable with comfort, the whole of the interior being practically sacrificed to the supposed comfort of the front seat. The reclining seat must be made with great judgment, and the chassis must be correctly suspended if comfort is to be derived from its use.

POSSIBLE NEW AUTO CONCERN

The Standard Steel Car Co., Pittsburgh, Pa., it is said, will soon enter into the automobile manufacturing business at its railroad car plant at Butler, Pa. While not much has been given out by the officials concerning the new departure, it is said that the old lead mill at the lower end of the work will be rebuilt and used as the manufacturing plant. This takes in about ten acres. Construction work has been going on there for some time.

The report that the company intended to spare less time in the making of steel freight cars and to devote more time to the making of automobiles was denied by F. C. Vanderhoff, who has charge of the automobile end of the business. He stated that the initial efforts of the company were purely experimental, and that no goal had been set as to the making of automobiles, as had been stated.

The works at Butler are about a mile long and several thousand workers are there in the steel car industry. In the event of the company going into the automobile business to any extent, there is a great deal of machinery in the works which could be used in this business.

MILLION A DAY, LARGE PART WASTED

Officials of the Office of Public Roads are pointing out that road building is an art based on a science, and that trained men are necessary to secure the best results from the expenditure of road funds. Although the average expenditure on the improvement of roads exceeds one million a day, a large portion of the money in the United States is wasted because of failure to build the right type of road to meet local requirements or failure to provide for the continued maintenance.

States and counties within six months have taken a greater interest in road improvement than ever, and there is now a strong movement to conserve the roads of the country where they are improved. Scientific maintenance will be one of the chief features of the work of the Office of Public Roads throughout the present year.

NEW HARDY BUGGY PLANT IN OPERATION

Having completed its plant the Hardy Buggy Co., which recently moved to Paducah, Ky., from Dallas, Tex., is now in operation with a large force of employes. The company is said to be behind with orders and will operate overtime until the demand is supplied. The stockholders elected the following directors: W. T. Hardy, H. C. Overby, L. F. Carson, R. H. Scott, B. M. Stephens, Charles Allcott. The officers elected were: President, W. T. Hardy; vice-president, H. C. Overby; secretary-treasurer, Charles Allcott. Mr. Allcott will be in general charge of the office.

VALUE OF THE CHEMIST

Glue and varnish seem to be the two articles most open to deception, and each does havoc when it is not right. It is very difficult to know just where to lay the blame. Buyers should always be on their guard in order to detect any deviation from the high quality required, right at the start, before too much mischief has been done.

I remember a manufacturer who was offered a pretty good varnish at a pretty close price, and he told them to send along a sample barrel, relates C. M. Mackay, in Wood Worker. The varnish was tried and proved to be all that the makers claimed for it. On the strength of this the buyer placed an order for a year's supply, and in order to be sure of getting from the same tank as the sample, he asked to have it sent along at once.

About six weeks after, the rubbers found the varnish was not the same as the sample. Rub it as they would, they could not keep it from "scouring," and it would not produce the clear polish of the sample barrel. The makers were appealed to, and at first they tried to bluff it out. They were told to send a man to investigate, which they did, and he found that the work produced by the last was not equal to the first. He then tried the argument that there must have been something about the manner of finishing to produce the difference. About this time the rubbing end of the finishing department got wind of a system of graft that had been going on at the varnishing end of the line, and the whole thing was exposed. The varnish makers were very glad to take the varnish back and refund the purchase price.

A thing like that could not happen in a thoroughly modern factory, with its laboratory, where articles could be tested and tried. No varnisher can tell in the ordinary course of using varnish whether one lot is precisely the same as another. They may notice a difference in the smell, but they can not say whether the difference in smell indicates an increase or decrease in quality. They cannot be sure of anything from a slight difference in the working quality, because atmospheric changes affect the working quality of varnish. The varnish that works stiff today may work freely tomorrow because of a change of temperature and humidity, and vice versa.

But in the thoroughly up-to-date factory it is not necessary to wait and try the goods out before their quality is determined. A short time ago a salesman left a can of varnish at a certain facory and asked them to try it. Part of it was sent to the laboratory to be tested and the balance sent on to the finisher. Both reported that the varnish was O. K. and would meet their requirements. On the strength of these reports an order was placed for a quantity of the same varnish. When it arrived a small quantity was sent to the chemist at the laboratory. Then the finisher was asked to try some of it. The finisher reported that nothing wrong could be detected in putting it on; there might be a little difference in the smell, but he could not be sure, as the sample had been all used up. But the chemist had discovered something wrong and he advised the rejection of the shipment. This varnish maker protested that he had sent exactly the same varnish as the sample submitted. He sent up the man who left the sample and sold the goods, and this person was willing to swear (and declared that the whole shipping staff was ready to swear) that no mistake had been made, and that the goods were the same as the sample.

The manager took the salesman up to the laboratory, where the salesman repeated all he had said about the impossibility of there being any mistake. The chemist listened until he got through; then he went over to a shelf and took down two bottles. On the label of one was written: "Date received, Nov. 4, 1912; sample varnish from D— & Co.; test No. 976."

Then the chemist took down another bottle, on which was written: "Dec. 15, 1912; shipment of varnish from D— & Co.; test No. 1011." He then handed the bottle to the varnish man, and, pointing to test No. 1011 in his book, said: "This is the varnish you sent us on our order and this is the result of my analysis. The difference between the varnish you left as a sample and the varnish your house filled our order with, as shown by this analysis, represents a difference in money of about 25c per gallon, or a little over $10 per barrel. It is just possible that it never would have been detected, at least not for some considerable time, because the real difference in the quality is in its durability. The varnish you sent us as a sample would be at its best long after this other lot had begun to yield to the influence of time."

All this speaks in favor of the laboratory and the chemical expert to make tests of everything coming through. Ten dollars a barrel on varnish would more than meet all the expenses of a laboratory in many factories. And suppose there were not mistakes enough detected to pay the expenses, that would not prove that the thing was not paying. The mere fact that you were on the lookout and the people knew that you were making tests, would have a steadying effect and make men more careful of the goods they sent.

All that has been said as to the value of the laboratory in testing finishing room materials, and much more ,may be said in its favor regarding the testing of glue. Not one man out of ten who use glue can tell whether it is worth 12, 15 or 18c per pound. Nor can they tell whether the barrel they are using today is the same quality as the barrel they used yesterday.

FOREST NOTES

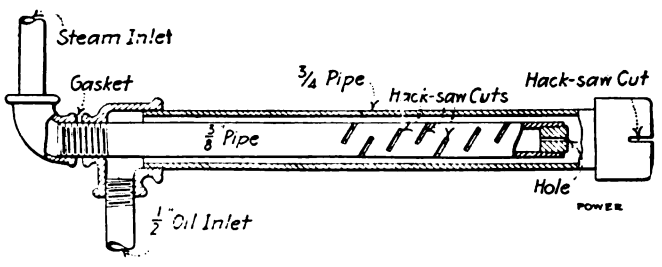
Contrary to popular belief, forest fires seldom travel more than two or three miles an hour. Even in extreme cases it is questionable whether they burn at a rate of more than six to ten miles an hour.

The forests of Corsica, the little island upon which Napoleon was born, are managed by the French government. They produce lumber, firewood, and turpentine, and all parts of the tree are far more closely utilized than in America.

HOME-MADE OIL BURNER

There are many patented oil burners and hundreds more that are not patented and every engineer has ideas of his own as to what constitutes a good burner. Following are directions for making a burner that gives very good results:

Get a ¾ x ⅜ x ½-in. tee, 12 in. of ⅜-in. pipe, 14 in. of ¾-in. pipe, one ¾-in. cap and one ⅜-in. elbow. Thread the ⅜in. pipe on one end and plug the other end. With a hacksaw cut



Details of Oil Burner

four, six or eight cuts diagonally across the pipe, the number of cuts being governed by the amount of work required of the burner. Now drill a small hole in the end of the plug like a miniature nozzle, dress the pipe over the saw cuts with a file and if any rough cuts have been made, peen them even to make a flat jet of steam from each cut strike the oil. Screw this pipe into the tee through the ¾-in. end and let it come through far enough to screw on the ⅜-in. elbow. Now screw

the ¾-in. pipe into the tee outside the ⅜-in. pipe and get the ⅜-in. pipe in the center of the larger one.

Cut an opening in the ¾-in. cap with a saw, the size of the opening to be governed by the amount of fire needed. For a small boiler, a coarse saw cut is sufficient with four cuts in the mixer, for a large boiler make more cuts in the mixer and a larger opening in the cap. Use a needle valve on the oil-admission pipe and let the oil to the burner under 40 or 50 lbs. pressure and at about 140 deg. F.

Insert the burner through the fire doors about the center of the firebox and do not let the blaze strike the boiler. Keep a bright incandescent fire by giving the proper amount of steam and oil and keep the stack damper as nearly closed as possible. Keep the ashpit dampers four to six inches open, just so quite a draft of air can be felt going into the pit.

An evaporation of 13.8 lbs. of water to 1 lb. of oil has been attained with installations equipped with this burner.

GUAYULE SAID TO BE DECREASING

The production of rubber from the guayule shrub in Mexico has fallen off considerably during the past two years from the high-water mark of 1910, when the exports declared to the United States were valued at $8,595,000. In 1911 they amounted to $5,641,800, and in 1912 to $3,363,700. This remarkable decrease is attributed to many causes, chief of which is the growing scarcity of the guayule shrub. Most of the smaller, more accessible estates from which the shrub was formerly obtained have been stripped bare, and only the companies holding long-time contracts for the guayule on the larger estates are able to obtain the shrub. The large companies hold such contracts and are able to continue operations while the small factories have had to pay exorbitant prices and then were able to work only part of the time during 1912. The shrub, which grows wild on otherwise waste land, requires at least seven years to mature, and as the greater part of the guayule has been gathered during the past four or five years, it will be several years yet before the new crop will contain the proper amount of rubber content to warrant its exploitation. Unsettled political conditions also seriously interfered with gathering and shipping the shrub. Under the circumstances, the figures for 1912 are good. Consequently prices paid for guayule shrub ranged high throughout the year, averaging $117.50 American currency per metric ton, the high and low prices being $132.50 and $100, respectively. Prices for the finished product (crude rubber) held steady during the year, ranging from 55 cents to 65 cents gold per pound f. o. b. Torreon. Practically all of the crude rubber produced in this district is shipped to the United States. The immense rubber plant of the Continental Mexican Rubber Co. at Torreon produced nearly twice as much rubber as its six competitors in the Laguna district. The Compania Hulera Nacional at Gomez Palacio, Durango, was purchased a few months ago by other interests, and extensive remodeling and enlargements were begun. It is expected that its former capacity of 400 tons of guayule per month will be more than doubled.

USE OF ROAD MOTOR CARS BY RAILWAYS

Consul Albert Halstead, Birmingham, says the British general post office has shown much enterprise in employing motor vehicles for the transfer of parcels and other mail matter between large cities, and the tendency is to use motor vehicles for carrying freight between different cities and for delivery purposes in the suburbs of large cities, for which work the railways were formerly used. This has apparently been somewhat to the disadvantage of the railways, but the latter have not been backward in using motor vehicles in connection with their services.

In the United Kingdom it is customary for the railways both to call for freight and deliver it to the door of the consignee. Prior to the development of the motor vehicle railways called for and delivered merchandise and freight with horse-drawn vehicles, but within the past few years they have substituted gasoline-driven commercial motor cars for this purpose to a very large degree.

This is one important feature, but of nearly equal importance is the tendency of great railways to bid for passenger traffic in parts of the country which their lines do not reach by means of a road-motor service. Foremost among the railways thus utilizing motor vehicles is the Great Western, which has some 33 distinct motor passenger services, including a number in the Midlands, notably in Staffordshire, where there are two services; in Gloucestershire; and the part of Wales nearest this consulate. At the same time motor omnibuses are used all along the line where they have been found profitable, notably in Cornwall, Devonshire, and the vicinity of London. Earlier services have been in use for some four years or more, and the fact that they have been increased is evidence that they have been found financially successful.

MOTOR ACCIDENTS IN GERMANY

From October 1, 1911, to September 30, 1912, 10,105 motor accidents came to the official knowledge of the German Imperial Statistical Office. These accidents involved 442 deaths, 7.7 per cent. of the fatally injured being drivers, 13.8 per cent. passengers, and 78.5 per cent. third parties. No fewer than 5,542 persons were more or less injured, the heaviest percentages having been supplied by third parties. The material damage is reckoned at 2,281,283 marks, 81.5 per cent. falling upon the automobile owners themselves. Of the drivers involved in accidents, 5.3 per cent. could not subsequently be traced, 1.5 per cent. vainly attempted to escape. In nearly 50 per cent. of the cases it was impossible to determine exactly how the accidents really occurred. To excessive speed or omission to give warning of approach 10.6 per cent. are ascribable, and to clumsy, careless driving 23.9 per cent. Only 10.8 per cent. occurred, it appears, through the fault of third parties.

WESTINGHOUSE AIR SPRING CO. INCORPORATED

Notice was recently filed by the Westinghouse Air Spring Co., of Pittsburgh, of an increase of capital from $200,000 to $2,500,000. The concern was formed about a year ago by George Westinghouse for the purpose of making a spring for pleasure vehicles. These, Mr. Westinghouse believes, will ultimately supersede pneumatic tires. Next year the company will be ready to enter the field commercially. Previously the springs have been made on a small scale.

TO PRODUCE GASOLINE BY REFRIGERATION

The Cutler process is the reverse of that usually employed to obtain gasoline—that is, refrigeration is utilized and well pressure instead of heat and artificial pressure. It is expected that the Olinda Gasoline Co., in Olinda, Cal., will produce 25,000 gallons of gasoline daily at one-half the cost of the old process, and that by the refrigeration method it will conserve the rhigolene, mythese, etc., which hitherto have passed into the air and gone to waste.

HENNEY BUGGY CO. PICNIC

The annual picnic of the employes of the Henney Buggy Co. plant at Freeport, Ill., took place on Saturday, August 23. The Henney band had been engaged for the day and a program of various athletic events was carried out. The employes assembled at the plant in the morning and, headed by the band, paraded over the down town streets, then to the Interurban station where special cars took them to Maple Park.

A TRUE MOTOR CARRIAGE

The most useful horse-drawn carriage for all-round purposes is a landau. This is proved by its popularity among all classes of owners, whether they use their carriages in town or country.

The landau provides vis-a-vis seating, which means greater sociability than is possible in other arrangements. It is an entirely open or closed carriage, the method of opening and disposal of the two halves of the head allowing the simplest possible mechanism to be used, while the weight of the open hood is properly distributed. These two points—simplicity and proper weight distribution—give the landau a considerable measure of superiority over the limousine landaulette, cabriolet, and other styles of motor bodies.

It may appear to be a simple matter to revive an old type of body, fasten it to a chassis, and then proclaim that the ideal motor carriage has been obtained. But it requires but little technical knowledge to appreciate that this seemingly simple operation has been frustrated, because the room required for the conventional forward position of the engine and its bonnet, the allowance for the folding of the portion of the hood over

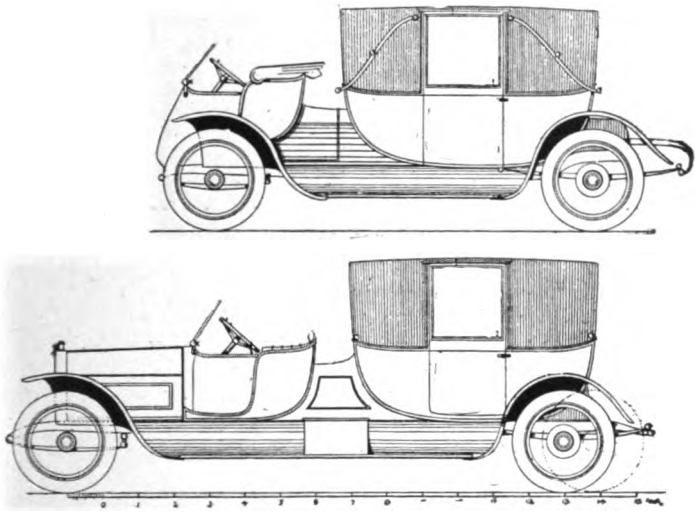


Diagram showing the difference in length between an ordinary motor landau, with engine in front, and the special Aberdonia landau

the front quarter, together with driving seat and other portions of the body, demand an enormous wheelbase, which would make an unwieldly car which only the very wealthy would care to maintain.

Mr. J. M. Strachan, of Brown, Hughes, and Strachan, Ltd., London, who is both a carriage builder and engineer, has gone fully into this matter, and has solved the difficulty by designing a chassis specially adapted to the requirements of the case. The chassis is a special Aberdonia, and considerable length of chassis is saved by placing the engine in an accessible position between the driving seat and main portion of the body. A part of the engine may be said to be under the seat, but it is not entirely so, for there is no need to disturb the occupants of the front seat in any way when inspecting the engine, although in the present instance the tank filler is at the back of the cushion. The radiator is placed below the front seat, while beneath it is a scoop which deflects air over the tubes. A fan is used in conjunction with the radiator, and the steering box is mounted well forward, with the modifications to the steering connections necessary owing to its special position. The gear box is retained in the usual position on the chassis.

Another excellent feature of this town carriage is that, although a large and roomy body is mounted, the hind seat is in the ideal position of being well forward of the hind axle—in fact, it would be possible to mount a larger body and still keep the hind corner pillar in front of the hind axle.

This type of chassis has possibilities in various directions which will be at once apparent to the practical man. For example, large limousines and landaulettes, the latter with spacious D-fronts, can be constructed, and, if a state carriage is required, then there is ample space for the generous proportions demanded in these cases, while, at the same time, the mechanical features of the carriage can be suppressed so that its value as a resplendent equipage is fully maintained. In order to show at a glance the difference in compactness between this Aberdonia landau and a landau with the same size body but mounted on the usual gasoline chassis, we have prepared a diagram showing the two landaus one above the other. The conventional landau requires a wheelbase of 14 feet, while the Aberdonia has only 10 ft. 8 in., with a hind seat well forward of the hind axle. If the hind wheel is placed in the same satisfactory position in the gasoline chassis, then a wheelbase of 14 ft. 10 in. would be demanded.

Covering the engine in this way brings forward various new problems, such as what design the front of the car shall possess, and how the outlines of the driving seat shall harmonize with those of the main portion of the body. Mr. Strachan has successfully grappled with these problems, as our illustration of the complete landau reveals. The entrance to the driving seat is in front, and the adjustable wind screen is hinged in the center vertically, so that it opens with the door on the near side.—Automobile and Carriage Builders' Journal.

NEW PACKARD FEATURE IS WORM BEVEL DRIVE

For some time the Packard Company has been working out a bevel worm drive that was a suggestion from its factory manager. The work was prosecuted very quietly, if not secretly. Now that it has been pronounced successful something is being said about it.

The teeth are so shaped that they come together with a gradual, sliding action, instead of the broadside slapping that characterizes the meshing of teeth cut in the ordinary way. The result is that noise in the running of the gears is eliminated to all intents and purposes, as is also the back lash that is so difficult to avoid in straight-cut bevels, or any other ordinary gears. Because the teeth of the new gears are curved, they afford a greater area of contact surface than straight teeth, and at the same time the curving form results in a sort of overlapping of the meshing process, the meshing pair coming together before the unmeshing pair become separated.

After the draughting room had finished its work, the tool makers took up the actual construction of the gears, and it required three weeks to make the first set. So well had the preliminary work been done that these original gears, when installed in an experimental car, worked out so satisfactorily that the necessary machinery for manufacturing was installed. Incidentally, it was necessary to design entirely new machine tools for the purpose, owing to the exceedingly peculiar form of the teeth.

GERMAN PRIZES FOR ADJUSTABLE BENZOL CARBURETORS

The Prussian Ministry of War has just issued the rules and regulations of a competition of carburetors specially designed for benzol which is to be held in December next. The competition is international, although one of the conditions requires that in the case of a foreign carburetor carrying off a prize, arrangements must be made for its manufacture in Germany. Entries at the rate of $125 per carburetor will be received by the Versuchs-Abtheilung des Militar-Verkehrswesen, 2, Siegfriedstrasse, Schoneberg, Berlin, up to November 1 next, the money being sent at the same time to the Kassenverwaltung

at the same address. The carburetors will be subjected to both road and bench tests, competitors being permitted to enter separate patterns for private and industrial vehicles. Four prizes are being offered in connection with the competition of respectively $2,500, $1,250, $750 and $500, the points to be taken into account in making the awards being simplicity and durability of construction, economical and noiseless working, facility of engine starting from cold and in cold weather, and ease of adjustability for use with gasoline. The tests will be made with ordinary commercial benzol supplied in the winter months of a specific gravity of about 0.880. Particulars of the competition can be obtained from the address given.—The Autocar.

PARIS IS TO BAR STEEL-TIRED AUTOS

The new Prefect of Police has decided that heavy motor vehicles with steel tires shall not be allowed in the city after October 15 of the present year, and that the speed of all commercial motor vehicles shall be limited to seven and a half miles an hour.

This measure has been taken owing to the large number of complaints made against the vibration set up by the very heavy vehicles running without rubber tires. The street departments have been aware that certain highways constantly used by steel-shod vehicles have been deteriorated and in some cases shaken to their foundations.

There is at the present time a very large number of motor vehicles in Paris without rubber tires. There are numbers of steamers with practically no weight limit, and all of them fitted with steel tires. All the reels of paper for the Paris dailies are brought from the mills ten miles out to the central printing offices on this type of vehicle.

TRUCKS BARRED FROM SHOWS

There will be no trucks or commercial vehicles of any sort at either of the forthcoming National shows in New York and Chicago. Although several months since it was decided to eliminate "truck week," as the second week of the shows had come to be termed, there were those who believed that commercial vehicles would be permitted to mingle with the pleasure cars. This belief, however, is put to rout by the official statement issued that both the New York and Chicago exhibitions will be devoted wholly to the display of pleasure cars.

The dates for the two shows are made public. The New York exhibit, which will be staged wholly in Grand Central Palace, will open January 3 and close January 10. The one in Chicago will occupy the Coliseum and First Regiment Armory, as formerly, and will open January 24 and terminate on the 31st. It will be the first time that both of them are under the management of the same organization, the merging of the N. A. A. M. and the Automobile Board of Trade into the Automobile Chamber of Commerce rendering this possible.

AUTOMOBILE WITH BOAT BODY

One of the latest French ideas in the sporting type of automobile is the pure boat body. The body is built upon ribs, carvel type, in exactly the same way as a boat, has its bilge rounded off, and is made with a torpedo stern.

The most difficult feature for the boat builder was the design of the forward sections so that they would harmonize correctly with the bonnet without giving a cut-off appearance. Naturally, the bonnet has been specially designed for the body, as is now done on all high class European bodies. To preserve the harmony of the lines, no doors have been made, the shape thus being continuous from radiator cap to stern. The gasoline tank is placed amidships just behind the front seats. In this position it forms a partial deck and still further adds to the boat-like appearance of the body. Electric lights are fitted, the side lights being let in the scuttle dash and the headlights being of the ordinary type. A dynamo is employed to generate current, this organ being under the foot boards just level with the dash and driven by an enclosed chain from the gearbox. Back of the rear seats is a locker. Except on the seats, there is no interior upholstery, the sides of the body, with the ribs and the rivetting, being left exposed, as in the case of a boat.

COST OF TRANSPORTATION TO SOUTH AMERICA

Very Valuable Book Ready fo United States Manufacturers

Foreign merchants contemplating the purchase of American goods always want to know the cost of the article delivered, and the inability or unwillingness of American exporters to quote c. i. f. prices has lost them many orders. To assist exporters in ascertaining delivery charges, the Bureau of Foreign and Domestic Commerce has published a bulletin compiled by Commercial Agent F. J. Sheridan dealing with transportation rates to the west coast of South America, this section of the foreign field being selected because of the trade activity that is expected to follow the opening of the Panama Canal.

The main part of the bulletin is a series of tables giving the frieght rates on over 800 articles from inland points in the United States to inland points in Equador, Peru, and Chile. Freight rates per 100 pounds, in carload and less than carload lots, are given to New York from Chicago, St. Louis, Cincinnati, Indianapolis, Cleveland, Detroit, Buffalo, Pittsburgh, Boston, Providence, and Hartford; ocean freight rates per 100 pounds and per cubic foot from New York to Guayaquil, Callao, Mollendo, Antofagasta, and Valparaiso, via the Straits of Magellan and via Panama; and freight rates per 100 pounds inland from Guayaquil to Quito, Callao to Lima, Mollendo to Arequipa, and Valparaiso to Santiago.

Lighterage, transfer, and other charges at the port of New York and at South American ports are shown, together with the cost of marine insurance, and data are also given as to consular fees and regulations and steamship requirements. Comparative tables give the competitive rates from European ports and from New York to South America.

In addition to these features, statistics are furnished to show the character of the goods sold by the United States to Ecuador, Chile, Peru, and Bolivia, and for each of these countries general information is given as to area, population, language, currency, postage rates, foreign trade, and distance from New York. Tables of price comparisons give the equivalents in the currency and measures of these countries of prices stated in the money and measures of the United States.

The bulletin, in short, is a compendium of practical information for the assistance of merchants who are engaged in the export trade or who contemplate entering the foreign field. Copies of the bulletin (Special Agents Series No. 72) may be obtained from the Superintendent of Documents, Washington, for 10 cents each.

A BIG BODY ORDER

The S. P. Sjoberg Co. recently completed delivery of what is claimed to be the largest single order for motor truck bodies ever placed. Specifications called for 100 unfinished bodies, all of large size, and delivery was to be completed within six weeks of the order's date. The last of the hundred reached the customer eight days ahead of the expiration of the period specified. The main factory of this firm is located at 70th street and Avenue A, New York, this being devoted entirely to the production of unfinished work. A branch factory was recently opened at 351 West 52d street, at which place complete finished motor car bodies are being produced.

AUTOMOBILE FREIGHT TARIFF CHANGES

Freight rate reductions ranging from 5 to 16 per cent. on transcontinental shipments of automobiles have been secured by the Automobile Chamber of Commerce on carload shipments ranging from 11,000 to 22,000 pounds and, likewise, reductions have been secured on commercial vehicles from the pleasure car rating, the reduction being according to a fixed differential.

In securing these rates the Chamber asked certain concessions and the result was a compromise. On delivery wagons, trucks or chassis and extra parts, finished or unfinished, but not including extra wind shields, lamps, search lights, head lights, speedometers, cyclometers and horns, in minimum carload weights of 12,000 pounds for 36 and 40-foot cars and 14,000 for 50-foot cars, the chamber asked: Group A, $2.65; B, $2.60; C, $2.52; D-J, $2.45. The railroads granted rates for the four classes of $2.80, $2.70, $2.60 and $2.50, but did not include delivery wagons with enclosed tops and made the weights: 36 and 40-foot cars, 12,500 pounds; 50-foot cars, 15,000 pounds. The original rates were: $3.30, $3.20, $3.10 and $3.

The present classification, which reads "Automobiles, passenger and freight," has been amended to include fire-fighting apparatus, hearses and tractors.

CHANGES IN PERSONNEL

W. A. Paterson Co., Flint, Mich., have arranged with W. G. Farmer, of Pontiac, to represent their line of work throughout Michigan. Mr. Farmer has traveled for the Pontiac Buggy Co. for a number of years, holding the record for volume in his territory. Mr. Farmer will make his home at Pontiac, Mich., but will travel continuously throughout the state.

Frank D. Weismantle, whose home is in Springville, N. Y., and who has been traveling for the past three years for the Michigan Buggy Co., has closed a contract with the W. A. Paterson Co. to represent it in eastern Pennsylvania, New Jersey, Maryland and Delaware. Mr. Weismantle has long been associated with the carriage trade, principally as a road salesman. He formerly covered the New England states for W. P. Mallon, of New York City. Mr. Weismantle states he is greatly encouraged at the outlook for 1914 throughout his territory.

C. F. Oatway, of Rochester, N. Y., and W. P. Mallon, of New York City, have just returned from Flint, Mich., where they have been going over the Paterson line of vehicles for 1914. Both of these gentlemen are enthusiastic over the prospects for the coming year and have renewed their contracts with the Paterson people for 1914. Mr. Oatway will cover the northern portion of New York, and Mr. Mallon, together with D. M. Chaffee, of Cortland, N. Y., will cover the southern portion of New York as well as the New England states, making their headquarters at 250 West 54th street, New York City. Mr. Mallon has represented the Paterson line in the east for 19 years continuously. Mr. Oatway has been selling Paterson work for the past 12 years.

TWO REMARKABLE PLANTS

Senor P. P. Calvo, an engineer, and resident of Bogota, Colombia, while in New York, told us of two very interesting plants that grow wild in his country and can be had by employing labor that costs fifty cents per day.

One is named muelle. It is a fruiting small tree that grows a pear-shaped fruit. Crushing the fruit when it is not quite ripe, a juice is expressed that has all the qualities of gasoline, and may be used without further preparation in a motor. Gasoline costs $1.25 per gallon in Bogota.

The frailyon is another plant that grows on the mountain waste spots at a higher altitude than Bogota, and is very abundant. It is also a wild tree. The leaf is the interesting part. From its tip exudes a sap that is a perfect turpentine, having all the properties of the commercial article. No use has been made of the knowledge, so far.

The Indians in traversing the mountain trails make beds or litters of these leaves, and such is the warmth that the bed affords, it becomes a compelte protection against the severity of the cold at nights in the high altitudes. These beds are left undisturbed by the makers of them so they may be ready made and useful for the next comers.

IDEA FROM ITALY

The Itala elastic wheel for heavy loads consists of a tempered steel tire which rests directly on the ground. This steel tire is connected with the inner part of the wheel by means of a double series of rubber rolls placed in special niches. This system softens the shocks which would otherwise be transmitted to the internal part of the wheel and consequently to the lorry. These rubber rolls can be easily changed, but this is very rarely necessary, because actual tests have shown that after 25,000 miles and more the rolls did not present any traces of wear.

The construction of these wheels is very costly, and consequently the application increases the price as compared with the normal wheels, but it is considered that the greater outlay is more than compensated during the use, as the large tire outlay is done away with. These wheels are constructed for any load, and are hardly heavier than those fitted with solid tires.

FOLLOWING NATURE'S WAY

Some makers of automobile tires will hereafter be found making a tire with ground tread studded with the shape of a horse's foot sole surface. A Detroit inventor has secured patent on such an idea and thus nature is being recognized as worth while considering.

This inventor doubtless took his cut from seeing how firmly the bare unshod hoof can hold the horse safely. The frog, if allowed to come in contact with the most slippery pavement, offers security to footing because of its very shape permitting suction through the cleft. Besides its rubber-like properties is an agent of security.

But the frog, unlike worn or polished rubber, will cling to the pavement, the weight of the horse assisting, of course, toward such effect. Then the inventor no doubt considered that within the entire body of sole the hollow provided another decided suction process which assisted greatly in holding his footing.—Horseshoers' Journal.

AUTO MODEL BUGGY

The Columbus (Ind.) Republican reports that the Fehring Carriage Co. has taken a buggy to the fair ground for exhibition that is an automobile body and is the first of the kind the local company ever built.

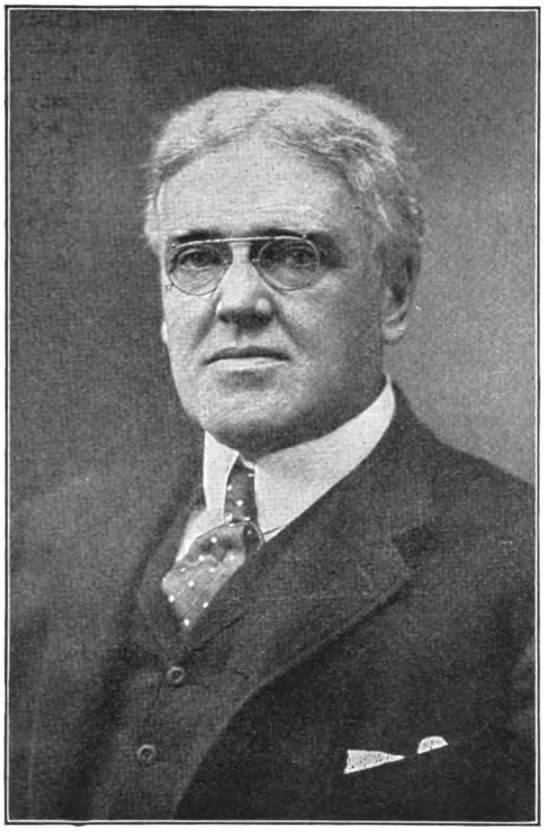
The new model has an automobile dash and has fore doors on either side the same as automobiles have. It has an automobile top and is equipped with electric lights. In addition to the side lights which show up the road ahead there is a red tail light such as automobiles are required to use.

UNION IS FORMED BY CINCINNATI CARRIAGE MAKERS

The employes of the Cincinnati carriage manufacturers have formed a union organization. The union is divided into the automobile workers, the wagon and carriage workers, and the custom men.

There was formerly an old organization of carriage builders in that city, but the members dwindled away.

DEATH OF THE PRESIDENT OF THE EBERHARD MANUFACTURING CO.



Alfred Atmore Pope, of Farmington, Conn., and Cleveland, O., died at his Farmington home on August 5, 1913, and was buried at Salem, O.

Mr. Pope was born in Vassalboro, Maine, in 1842, the son of Alton and Theodate (Stackpole) Pope, this name at that time being well known among the respected Quaker families of New England and Pennsylvania, as well as among the small manufacturers of the period, whom the water power of New England had stimulated into activity.

In his early boyhood the family moved to Salem, O., and his school days were spent in that Quaker town, and a few years later, in Cleveland, O., where in early manhood Mr. Pope's business experience began. After six or eight years as a partner in the woolen manufacturing business conducted by his father and brothers under the firm name of Alton Pope & Sons, his connection with the malleable iron business began in the year 1869. This became the leading commercial interest of his life, which he, associated with the men who became his lifelong friends and partners, developed and extended more than any other group of men from a little known and poorly understood process of manufacturing tough and more or less malleable, iron castings, into the great and important factor in the iron trade of the United States to which it has grown in our time.

A rare combination of patience, foresight, untiring devotion to detail, a gift for inspiring and rewarding the best efforts and stimulating the best qualities of other men, absolute justice, were among the many striking elements of Mr. Pope's successful career.

Under his inspiring leadership the Cleveland Malleable Iron Co. rapidly grew in importance and reputation and its operations extended in the course of years to other communities, resulting finally in the great group of malleable and steel plants at Cleveland, Chicago, Indianapolis, Toledo and Sharon, now known as The National Malleable Castings Co.

The Eberhard Manufacturing Co., of Cleveland, established in 1879, at first intended to produce light and difficult castings, has developed from small beginnings into one of the largest manufacturers of vehicle and saddlery hardware in the world.

The Ewart Manufacturing Co., of Chicago and Indianapolis, now a part of the Link-Belt Co., originators of detachable link belting, is another of the large enterprises which grew and developed to its present standing under Mr. Pope's management.

At the time of his death, and in fact from their beginnings, Mr. Pope was president of The National Malleable Castings Co. and The Eberhard Manufacturing Co. He was also director in many other manufacturing enterprises and banks; also president of Westover School, Middlebury, Conn.; trustee of Western Reserve University; member of the Royal Society of Fine Arts, London, and member of the Visitors' Committee of the Fogg Museum of Fine Arts of Harvard University.

His close personal relation with his business enterprises was maintained with unflagging interest and efficiency to the day, almost to the moment of his death, and his activity of mind and body, his capacity for efficient leadership, his remarkable "path-finding" genius, which enabled him to anticipate commercial needs and opportunities far ahead of their coming, were as vigorous and as alert to the every end as they had been in middle life, and were as modestly and completely at the service of his associates as they had been the many years when he remained in the daily routine of work.

His noble personality impressed itself on all who met him, for he was one of those who know no line of cleavage between their commercial and their personal lives. The white integrity of his character was impressed on the least detail of every business which he controlled, in every relation both within its organization and with the outer business world. A long and active business life left his ideals untarnished and in the minds of his associates his commercial genius, great as it was, was overshadowed by the other many and greater traits of character which met recognition far from the market place.

A NEW SUGGESTION

A law requiring shippers to insert the actual weights, or the shipping weights of goods which are not carried at actual weights, in all bills of lading is being advocated by the American Association of Freight Agents. The agents contend that the shippers easily can supply information as to weights and by doing so they would lighten the labor of railroad employes as well as prevent errors due to careless weighing or estimating weights. Of course it woud be necessary, they say, to check up weights occasionally to prevent dishonest shippers from putting goods through at underweights, but they believe that practically all shippers can be trusted to insert the correct weights.

CHANGES

E. F. Warren has been appointed chief draftsman in Plant No. 10 of the Studebaker Corporation.

E. N. Sanders, formerly manager of the Moon Motor Car Co., of Illinois, has been made manager of sales west of the Rocky Mountains; Sanders is one of the veterans of the trade, having originally been allied with the bicycle business.

BIG VELIE OUTPUT

Thirty thousand complete jobs turned out of the plant of the Velie Carriage Co., Moline, Ill., during the fiscal year that has just come to a close sets a new record in output since organization of that concern. The increase over the preceding year was approximately 25 per cent., and the 1913 output is slightly in excess of the year 1910, when a record of some odd 29,000 jobs was set.

Trade News From Near and Far

BUSINESS CHANGES

Curyea & Son have disposed of their stock of buggies, etc., in Alvo, Neb.

C. O. Hunnel has sold out his stock of vehicles, etc., in Thedford, Neb.

A. J. Roe has purchased the business of W. H. Green, in Creighton, Neb.

West & Ralf have succeeded to the business of L. L. West, in Hydro, Okla.

C. C. Wellensgard has purchased the vehicle business of L. C. Wellensgard, in Berlin, Wis.

Geo. Pullam has disposed of his stock of vehicles, etc., in Wellsville, Kas., to F. O. McCain.

The Holt & Tripp Co. has succeeded to the business of the Ertesvang Co., in Bottineau, N. D.

C. E. Thomas has purchased the stock of buggies, etc., of Thomas & Felix, in Willow Lakes, S. D.

Chas. Tiede, of Enterprise, Kas., has purchased the Bricker stock of vehicles, etc., in Russell, Kas., and A. G. Mai is manager.

Elliott E. Brooks has purchased a half interest in R. L. Briscoe's implement, wagon and buggy business in Fredericksburg, Va. The firm name will be Briscoe & Brooks.

The Deeds & Hirsig Mfg. Co., of Nashville, Tenn., will be dissolved. The J. B. Deeds Buggy Co. will succeed to the buggy end of the business, while W. G. Hirsig will continue with the automobile branch.

NEW FIRMS AND INCORPORATIONS

L. Rollo Breed has engaged in the buggy business in Hydro, Okla.

Ira Baker is about to open up a new stock of vehicles, etc., in Nevada, Ia.

The Geo. Bohon Co. is about to build a carriage factory in Harrodsburg, Ky.

G. J. Klein is about to open a new stock of buggies and hardware in Adams, Neb.

Ross Bros. have engaged in the vehicle and hardware business in Eureka, Kas.

Griffin & Blanton have opened up a new stock of vehicles, etc., in Montezuma, Kas.

The Bushnell Co. has engaged in the vehicle and automobile business in Fremont, Neb.

Anders & Kay have engaged in the buggy and implement business in Halliday, N. D.

C. O. McCourtney is engaging in the vehicle and implement business in Table Rock, Neb.

G. M. Wilson, of McKinney, Tex., is about to engage in the buggy business in Bishop, Tex.

Chas. and Sheridan Robertson are about to engage in the vehicle business in Aurora, Mo.

A. W. Olson has opened a new stock of buggies and implements in Mineral Springs, N. D.

Finnegan & Briel, of Spitzer, Wis., who were recently burned out, have again resumed business.

W. W. Groves ,of Meridian, Ida., is about to open a new stock of vehicles, etc., in Nampa, Ida.

Saml. E. Keener is about to engage in the vehicle and implement business in Clay Center, Kas.

The Cameron Wire Wheel Co., Detroit, capital $25,000, has been incorporated to manufacture wheels.

T. J. Boe, of Williston, N. D., is about to engage in the vehicle and implement business in Arnegard, N. D.

M. J. Spalding and Leo Spalding have formed a partnership and opened a stock of vehicles, etc., in Vinita, Kas.

The Gibbons Mfg. Co. has established a factory in Clarksville, Tex., to manfacture wagon boxes and wagon spring seats.

The Henderson (Ky.) Buggy Co., capital $10,000, has been incorporated by Ed. J. Schlamp, Mrs. Mary D. Schlamp, and others.

The Muskogee (Okla.) Vehicle & Machinery Co. has been incorporated with a capital of $10,000 by R. A. Lester, N. Lester and Walter Van Allen.

The Champion Wagon Co. has been incorporated at Oswego, N. Y., to manufacture autos, wagons, etc.; capital $25,000; by F. C. Hill, J. S. Truman.

Land has been leased in Clarksville, Tex., by the Gibbons Mfg. Co., for the erection of its new factory. The company will manufacture wagon beds, seats, wheelbarrows and other articles. The amount invested in the new enterprise will be $15,000.

IMPROVEMENTS AND EXTENSIONS

The Banner Buggy Co., St. Louis, will put up a $3,000 addition to its factory.

M. Skala & Son are erecting a new vehicle warehouse in Red Lake Falls, Minn.

Ross Bros. have moved their stock of buggies, etc., in Eureka, Kas., into new quarters.

A new building has just been completed for the Durham (N. C.) Vehicle & Harness Co.

The John Deere Wagon Co., Moline, Ill., has increased its capital from $500,000 to $1,000,000.

The McCleanhan Co. is about to begin the erection of two brick business buildings in Quinton, Okla.

The Schweitzer carriage shop in Wheeling, W. Va., will put up an addition that will double the size of the plant.

The Velie Carriage Co., at Davenport, Ia., is making additions to its buildings which will increase its floor space by fifty per cent.

The Townsend Buggy Co., established in Winston, N. C., three months ago, has been compelled to double the space of its salesroom.

The Wright Carriage Body Co., at Moline, Ill., has let a contract for an addition to its plant to cost $7,500. A lot of new machinery will also be installed.

A new two-story 50-foot front brick building will be constructed for the Model Carriage Works at Enid, Okla. It will be modern in every respect. Ed. Myers is the proprietor.

The new six-story buggy factory of the Parker Mfg. Co., at Suffolk, Va., will be ready for operation about the middle of September. The new factory takes the place of the two buildings destroyed by fire, the first being burned in November, 1912, and the second last February. The total floor space of the new building, including the two-story warehouse on one side, is 51,888 square feet, and the factory will have a capacity of 25 vehicles per day.

FIRES

A. T. Peterson, a vehicle dealer of Toledo, Ore., has suffered a fire loss of $2,000.

The stock of vehicles, etc., of Tom Dunn, in Jamaica, Ia., has been destroyed by fire.

Joe Binz, horse and vehicle dealer at San Antonio, Tex., sustained a severe fire loss on July 26.

The carriage firm of Fulmer & Brittain, San Antonio, Tex., has suffered a fire loss of about $15,000.

Fire on August 9 destroyed the blacksmith shop and carriage works of Thompson Bros. & Irwin, at Harlan, Ia. Loss, $3,000.

The carriage manufacturing plant of James A. Spence, at Easton, Md., was destroyed by fire July 26. Fully covered by insurance.

The plant of the Showalter Mfg. Co., makers of automobile bodies, housed in a frame building at 308 Hanson avenue, Indianapolis, Ind., was destroyed by fire. Loss, $12,000.

A fire, supposed to have been caused by hot ashes from a forge, damaged the wagon works of Morris Soffe, Washington and Moyamensing avenue, Philadelphia, to the extent of $4,000, August 19. The blaze was discovered shortly after the plant closed down at 5 o'clock, and before it was extinguished had gutted the second floor and destroyed the machine shop.

NEWS OF THE AUTO TRADE

The Gardner Bros. Co. has engaged in the automobile business in Marysville, Ky.

The Chawk-Smith Auto Co. has been incorporated in Louisville, Ky., with a capital of $10,000.

The Monarch Auto Co. has been incorporated in Louisville, Ky., with a capital stock of $10,000.

The Wright Auto Co. has been incorporated in Rosendale, Mo., with a capital stock of $4,000.

The Selma Motor Car Co. has been incorporated in Selma, N. C., with a capital stock of $25,000.

The Bragley-Moore Auto Co. has been incorporated in San Marcos, Tex., with a capital of $6,000.

The Jackson Motor Co. has been incorporated in Kansas City, Mo., with a capital stock of $10,000.

The Kentucky Kissel Kar Sales Co. has been incorporated in Lexington, Ky., with a capital of $1,200.

The Chandler Motor Car Co. has been incorporated in Fort Worth, Tex., with a capital stock of $5,000.

The Metallurgique Motor Car Co., of St. Joseph, Mich., has been succeeded by Doris Crawford & Co., Ltd.

The Ash Implement Co. has purchased the automobile business of Homer Underwood, in Wellington, Kas.

The Meester Auto Co., of Ellsworth, Minn., has purchased the business of G. H. Watson, in Rock Rapids, Ia.

The Bremer Wilson Mfg. Co., Niles, Mich., to manufacture autos, has been incorporated with a capital of $100,000.

The El Paso Rubber Vulcanizing & Auto Co. has been incorporated in El Paso, Tex., with a capital stock of $100,000.

The Vanguard Mfg. Co., Hamtramck, Mich., to manufacture auto engines, has been incorporated with a capital of $100,000.

The Badger Auto Co. has been incorporated at Mayville, Wis., capital $20,000, by Richard A. Ruedebusch, Fred J. Lang and Antoinette Lang.

The LaBell Funeral Motor Car Co., manufacturers, has been incorporated at Detroit, Mich., with a capital of $25,000 by Alex. LaBell and M. W. Benjamin.

Peterson Keys Auto Co., capital $10,000, has been incorporated at Indianapolis to deal in autos by Wm. B. Peterson, Paul H. Keyes and A. A. Peterson.

Although the company did a half million dollar business last year, the makers of the Hayes Ionia auto at Ionia, Mich., planned at their annual meeting to increase the 1914 output by 25 per cent. A dividend of 7 and 8 per cent. on common and preferred stock was declared. The company employs 400 men and has a weekly payroll of $6,000.

FINANCIAL TROUBLES

Upon application of Salzburger & Sons Co., of Chicago, and the First National Bank at Cleveland, O., Judge Clarence W. Sessions in United States District Court on August 6 appointed the Detroit Trust Co. as receiver for the Michigan Buggy Co. of Kalamazoo, maker of the Michigan automobile. In the bill filed in the court the liabilities of the concern are placed at $1,600,000. A large portion of this indebtedness is in the form of commercial paper or promissory notes unsecured. It is declared that a number of Detroit banks as well as those in Chicago and the east are holders of this paper. The assets are said to be $2,000,000.

The indebtedness of the firm to Salzburger & Sons Co. is $8,483.44, of which $2,393.70 is overdue while the Cleveland bank is creditor in the sum of $3,600, all in promissory notes which are past due.

The receiver will operate the company so that the property can be sold as a going concern. The concern had been engaged in the manufacture of horse-drawn vehicles for 30 years but a few years ago took up the manufacture of automobiles which was the direct cause of its downfall.

On August 14 the Continental and Commercial National Bank of Chicago began suit in the United States District Court against M. Henry Lane, Frank B. Lay and Victor Palmer, officers of the company. Damages asked are not to exceed $150,000. The W. T. Richards Co., Jefferson Park National Bank, and Walter F. Lewis, all of Chicago, have filed a second petition in bankruptcy directed against the company.

A petition in bankruptcy has been filed against Jacob Weil, doing business as Weil Brothers, at 269 Grand street, New York. The liabilities are said to be about $6,000 and the assets about $400.

An involuntary petition in bankruptcy was filed August 16 against the Hall Buggy Co., of Chattanooga, Tenn. General insolvency is alleged in the petition and an equal distribution of the assets is asked. The petitioners signing the paper with the amount of their claims are as follows: Owensboro Buggy Co., Owensboro, Ky., $1,003.47; P. Gormans & Sons, Hillegom, Holland, $87.70; the Chattanooga News, $66.60.

Philip C. Braun, cashier of the People's First National Bank, Lawrenceburg, filed a petition in the Dearborn county circuit court August 25, requesting that a receiver be appointed for the James & Meyer Carriage Mfg. Co., of which he is a stockholder. Judge Warren N. Hauck named George Kunz, a stockholder, as receiver. Mr. Kunz filed a bond in the sum of $30,000. He will continue the operation of the plant and buy material to deliver $50,000 worth of orders.

MR. KERR STICKS TO BODY DESIGNING

To enable their body engineer, Mr. George W. Kerr, who since the establishment of the company's body plant at East Springfield, has acted as manufacturing superintendent, to devote his entire time to the designing and engineering department, the Stevens-Duryea Co. has secured the services of Mr. John B. Richards as manufacturing superintendent. Mr. Richards for the past nine years has been superintendent of the Springfield Metal Body Co. This change occurred August 1.

NEW COMPANY TO TAKE OVER RACINE SATTLEY CO.

W. H. Robinson, formerly secretary of the Racine Sattley Co., and J. O. Kennedy have organized a company to take over the interests and properties of the old Racine Sattley Co. in that city. The factory has been closed for two years.

OBITUARY

Edward D. Bellamy founder of the Florence (Ala.) Wagon Works, died in August from a stroke of apoplexy. He was a resident of Florence for 25 years, coming originally from the north. His wife and seven children survive him.

Georg- Lauber, 77, one of the oldest carriage and wagon makers in the city of Mobile, Ala., and a Confederate veteran, died August 5. He had been ill for some time. Mr. Lauber was born and educated in Hessen-Darmstadt, Germany. When but a young man he came to the United States with his parents. About 50 years ago he moved to Mobile and started in the carriage and wagon business. Besides his widow he is survived by one son, four daughters and twelve grandchildren.

John H. Lutes, 80, an old time carriage manufacturer, died in Caldwell, N. J., following two months illness. He was in business for himself for some years. Later he was connected with the Quimby Carriage Mfg. Co. for about 25 years. He had retired five years ago. Four children survive.

Patrick O'Brien, president and founder of the O'Brien Varnish Co., South Bend, Ind., died August 10.

Chas. Will, 44, wagon manufacturer of New Orleans, La., died July 24. His wife survives.

ALCO DISCONTINUES

The American Locomotive Co., builders of Alco touring cars and trucks, voted to discontinue its entire automobile business, at a meeting of its directors held on August 13. The passenger cars and trucks on hand are being disposed of at fire-sale prices, reductions of little more than one-half the list prices. Materials on hand in the big factory at Providence, R. I., will in the next three months be worked into completed vehicles, by which time it is hoped that all manufacturing will be completed.

All selling agency arrangements have been cancelled and the company's selling branches at New York, Boston, Philadelphia, Chicago and Montreal will be disposed of as soon as possible.

The big service building in Long Island City will be continued and will be headquarters for Alco automobile supplies and repairs.

The undoubted reason for this action lies in the fact that the company has lost money on practically every passenger car, taxicab, and truck sold by it since 1906, when it entered the field. This loss was an annual story and each year at the annual meeting, held between August 15 and 30, the question was invariably asked, "Shall we continue the automobile business or not for another year?" From those who have been close in touch with the affairs of the automobile department it is evident that of late these annual losses exceeded $500,000, due largely to poor production methods, and general uncertainty regarding the policy to be followed from one year to another. The engineering, selling and advertising departments rarely knew before the annual meeting at the close of August what policy and program they could carry out for the following year, whereas at this date rival companies had their models for the following year on the market and well advertised. Such delays and failure to rationally comprehend the tides and times of the motor industry would make any company a signal failure. Advertising appropriations that were asked for in June were not forthcoming until the end of October or early in November.

The history of the Alco car dates to 1906 when the American Locomotive Co. purchased the rights to build the Berliet, of Lyons, France, in America on a royalty basis. The manufacture was carried on at Providence, R. I., in a remodeled locomotive plant which the company had on its hands. After three years the royalty agreement was discontinued and the company brought out its own line of cars and introduced the name Alco. Soon after this the truck business was started.

The American Locomotive Co. is a $50,000,000 corporation and had $6,000,000 invested in the automobile department. The Long Island City service building is valued at $120,000 with parts at $125,000. The Chicago branch has a valuation of $120,000; a stock of $175,000 in parts is carried on the Pacific coast. The Philadelphia and Boston branches were rented properties.

KRIT ALSO IN TROUBLE

Although the book profits of the Krit Motor Car Co., of Detroit, Mich., for the past year were $145,000, weather conditions in the west, where Krit sales are heaviest, and a general financial stringency, made it necessary for the company's creditors to take a hand in affairs for the purpose of adjusting matters in an effort to save the company from more serious trouble.

Despite the fact that an indebtedness of $900,000 was disclosed, the assets are said to be ample to meet all obligations under normal conditions, and 70 per cent. of the creditors have assented to a plan which was offered by a committee. The creditors' agreement stipulates an extension of time as follows:

Ten per cent. to be paid on or before February 1, 1914; 20 per cent. on or before June 1 and 20 per cent. on or before October 1, 1914; 15 per cent. on or before February 1, 1915; 15 per cent. by June 1 and 10 per cent. by October 1, 1915, and remaining 10 per cent. on or before February 1, 1916.

Six per cent. notes, dated August 26, in proportionate amounts, maturing as indicated above, are to be given creditors, provided 80 per cent. sign the agreement. It is expected that the stockholders will surrender 51 per cent. of the stock for the purpose of corporate control, to the Union Trust Co., as a trustee, to vote for the creditors; creditors will take the place of four directors, who will resign.

Walter S. Russell, who is regarded as one of Detroit's best and most conservative business men, and who has been intensely interested in the Krit company, was shown at the creditors' meeting to have advanced cash to the amount of $300,000, which is included in the $900,000 of indebtedness. Russell has gone as far as his means permitted, which left the request for a time extension the only exit from the situation.

Part of the consideration for entering into the agreement is that the indebtedness to Russell shall not participate in payments as before provided, but the time of payment for him shall be postponed until 50 per cent. of the creditors signing the agreement shall have been paid. Then Russell participates, so that ordinary creditors receive full payment before Russell gets 50 per cent. of his.

All bills of $200 or less are to be paid in 60 days, but it is agreed that in default of payment as set forth, the creditors may terminate the agreement.

WHO USE THEM

The Adams Express Co. is now operating 485 motor wagons in different cities; the American Express uses 352, and altogether the five leading express companies have 968 in service. The New York Edison Co. has 104, Gimbel Bros. 100, Jacob Rupert's Brewing Co. 81, Western Electric Co. 63, Texas Oil Co. 53, Jas. A. Hearn & Co. 73, Peter Doelger 57, Burns Bros. operate 21 ten-ton trucks, and there are many others that might be enumerated.

GOOD LUCK TO IT, SAYS BANNISTER

"We have therefore sold out our automobile wheel business—lock, stock and barrel. It will be moved to Canada—good luck to it."

CARRIAGE BUILDER MINISTER TO PORTUGAL

Colonel Thomas H. Birch, of Burlington, N. J., has been appointed minister to Portugal. The salary is $10,000. Colonel Birch was offered the post of Ambassador to Persia, but declined the appointment.

Colonel Birch is the youngest son of James H. Birch, Sr., whose name as a carriage manufacturer is spread over the world. It was through the instrumentality of Colonel Birch that Bryan and President Wilson were first brought together, when the latter was governor of New Jersey.

Colonel Birch was one of the compaign managers of the Wilson headquarters at the Baltimore convention and won fame as the "Beau Brummel" of the Democratic hosts.

ANOTHER DURANT-DORT PLAN

The Chevrolet Motor Co. is finally preparing to leave Detroit and take up its abode in Flint, Mich. A portion of its effects already has been removed and it is expected that the company will be in Flint about September 1. It will occupy buildings vacated by the Imperial Wheel Co., which has transferred its equipment to what is known as the Webster plant on Ridgefield road.

CHANGE

C. H. Gray, manager of the Goodyear Tire & Rubber Co.'s branch in Milwaukee, has resigned that position and will return to Texas, where he expects to set up in business for himself. Gray had been identified with the Goodyear company for some nine years.

GENERAL MOTORS ANTICIPATES A PAYMENT

The General Motors Co. has anticipated to the extent of $1,000,000 the $2,000.000 payment on account of its sinking fund which is due October 1. The amount has been paid in cash to the Central Trust Co., of New York, the trustee.

WANTS

Help and situation wanted advertisements, 1 cent a word; all other advertisements in this department, 5 cents a word; initials and figures count as words. Minimum price, 30 cents for each advertisement.

PATENTS

Patents—H. W. T. Jenner, patent attorney and mechanical expert, 606 F St., Washington, D. C. Established 1883. I make a free examination and report if a patent can be had and exactly what it will cost. Send for circular.

FOR SALE

Elliott dash stitching machine. Address E. G. B., care The Hub, 24 Murray St., New York.

SALESMEN WANTED

Wanted—Experienced salesmen for New York, New Jersey, Pennsylvania, Ohio and New England by one of the largest wagon factories in the east. Farm, spring and dump wagons. None but first class men with established trade need apply. Give references, by whom employed, age, etc. Communications strictly confidential. Address Trade News Publishing Co., 24 Murray St., New York.

SITUATIONS WANTED

Wanted—Foremanship in carriage, wagon or automobile shop by a man who is competent in blacksmithing, woodworking and painting and understands trimming; can make own drafts if required; prefers position in the east. Address M. L., care The Hub, 24 Murray St., New York.

Wanted—Position as superintendent in carriage factory, by capable man, with several years' experience as foreman and superintendent; best credentials. Box 32, care The Hub, 24 Murray St., New York.

NEW BUILDINGS ORDERED

The Pennsylvania Rubber Co., whose factory is located at Jeannette, Pa., will soon award separate contracts for new buildings at the factory site. One structure will be a one-story brick and steel frame structure to be used as a power plant, to be 80 x 80 feet, and a lean-to 50 x 50 feet. This latter building is to contain turbine and boilers.

The Continental Rubber Co., Erie, Pa., has plans ready for the building of a large addition to its plant. The building will be four stories high, measuring 226 x 75 feet, with reinforced concrete foundations and brick walls.

EX-C. B. N. A. OFFICER A CONGRESSMAN

Maurice Connolly, of Dubuque, Iowa, a vehicle builder, and an ex-president of the Carriage Builders' National Association, has been elected to the Congress from the Third Iowa district, the old district of Speaker Henderson and Senator Allison.

Mr. Connolly's father was one of the distinguished carriage builders of the past regime, whose fame was country-wide.

INDEX TO ADVERTISERS

THE FEDERATION OF TRADE PRESS ASSOCIATIONS IN THE UNITED STATES

Business Promotion Through Trade Press Efficiency

is to be the keynote of the most notable gathering of technical, class and trade journal editors and publishers ever held in America. No live manufacturer, sales manager, advertising man, trade paper editor or publisher can afford to overlook the

Eighth Annual Convention of the Federation of Trade Press Associations in the U. S. at the Hotel Astor, N. Y., Sept. 18, 19, 20, '13

Two sessions will be held daily. There will be editorial, circulation, advertising and publishing symposiums under competent leaders. Many of the leading editors, business managers, buyers and sellers of advertising, and authorities on modern merchandising methods will take part. On Friday afternoon, September 19, there will be a mass meeting with addresses by representative business and professional men, on subjects of timely interest to editors, publishers and advertisers. Distinguished guests and worth-while speakers will be at the annual banquet, which will be made a memorable social occasion. No matter what may be your connection with the trade journal field, if you are interested in the idea of business promotion through trade press efficiency, if you believe in business papers for business men, you will be welcome at all sessions.

Full information may be obtained from

The Committee of Arrangements

WM. H. UKERS, Chairman, 79 Wall Street, New York

The Federation of Trade Press Associations in the United States

President	Secy.-Treas.	Vice-President
H. M. Swetland	Edwin C. Johnston	E. C. Hole
New York	New York	Chicago

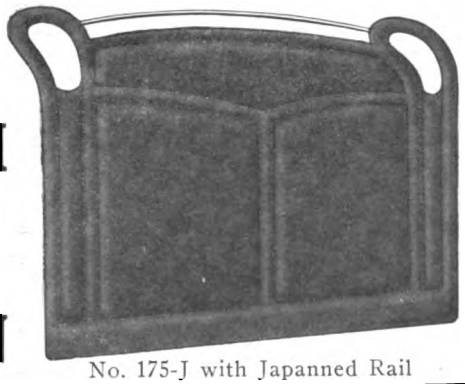
BUSY BUYERS BRIEFS

McKINNON DASH COMPANY

BUFFALO, N. Y.

TROY, OHIO — ST. CATHARINES, ONTARIO
CINCINNATI, OHIO

Try Our No. 175 J. DASH For Your 1914 ROAD WAGON



No. 175-J with Japanned Rail

Remember to Call for

JAPANNED RAIL PADDED DASHES

For All Vehicles

"BLACK VELVET" CUSHION SPRINGS

Manufactured Only by the

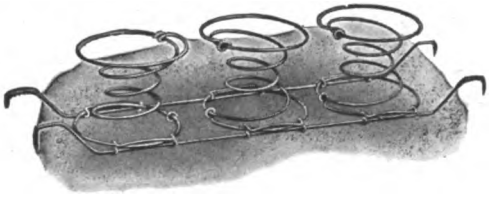
NATIONAL SPRING AND WIRE COMPANY

ALBION, MICH. WINDSOR, ONT.

THE SPRING OF QUALITY.

SPRING or SOFT EDGE CUSHION FRAME

For Buggies or Other Vehicles. Built of the Highest Grade of Steel Wire.



STRIP FOR WOOD OR BOX FRAME

WILLEY'S COLORS

The RECOGNIZED STANDARD

C. A. WILLEY CO.

COLOR GRINDERS

and Manufacturers of Specialties in

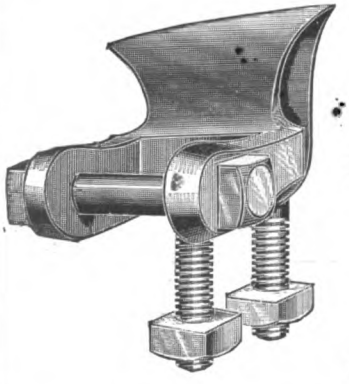
CARRIAGE, AUTOMOBILE AND CAR

PAINTS

COLORS, VARNISHES, ETC.

HUNTER'S POINT, NEW YORK CITY

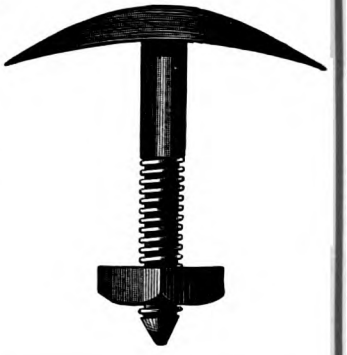
Skewed Shaft Couplings



Regular or Oval Patterns For High Arched Axles

Furnished in rights and lefts for any height of arch. Oval Axle Clips 5/8 or 3/4 width to match Oval Couplings. Bolts, Clips, Couplings, Carriage Hardware and Special Forgings

Catalogue "H" and Prices on Application



COLUMBUS BOLT WORKS, Columbus, O.

The Hub

TRADE NEWS PUBLISHING COMPANY
24-26 MURRAY ST. NEW YORK

You at the Convention Know

The Firestone Factory has always stood first of all for tire quality and mileage. With you makers Firestone Carriage Tires mean the stamp of class on every job you send to your dealers.

With the Firestone name you get always the prestige of perfection in material and design. That counts with the dealer and it counts with the user.

Firestone

Carriage Tires

Made in the Largest Plant in the Country Devoted Exclusively to the Making of Tires and Rims

Visit the Firestone Booth at the C. B. N. A. Convention, St. Louis, Oct. 13-17. Let our representative explain to you Firestone construction and Firestone high quality of rubber and workmanship.

In every reel of Firestone Carriage Tires there is the quality that has made Firestone Pneumatics the first choice of fine automobile builders, discriminating automobile owners and Race Kings all over the world—note the string of amazing Firestone victories in grinding races where tire endurance counts even more than speed.

Don't miss our exhibit at the C. B N. A. Convention.

Write for our new Booklet and interesting prices.

The Firestone Tire and Rubber Co.

Akron, Ohio **All Large Cities**

"America's Largest Exclusive Tire and Rim Makers"

The - Best - Dealers - Everywhere - Handle

Hercules Buggies

W. H. McCURDY
President

"It is my desire that every transaction with this concern be a satisfactory one to each and every customer."

Have you read Mr. McCurdy's speech on "Economy and Efficiency in Manufacturing," delivered while he was president of the Carriage Builders' National Association? If not, we will be glad to mail you a copy free upon request.

This Has Been the Biggest Year in Our History

Over 85,000 Vehicles Built and Shipped During the Past Twelve Months

We are now working on a large addition to our mammoth plant that will increase our output to 100,000 jobs per year and *will insure prompt delivery at all times during the year.*

SOMETHING NEW IN OUR 1914 LINE
GET THE LATEST AND ADVANCED STYLES
150 STYLES FROM WHICH TO MAKE YOUR SELECTION

Do not delay but write for catalogue and prices today ➡

We Sell Only One Dealer in Each Town

Hercules Buggy Company

Capital $1,500,000 **Evansville, Indiana**

FILL OUT—DON'T DELAY—MAIL TODAY
Send your 1914-152 page Catalogue and lowest Wholesale Carload prices to
Name.....
P. O.....
County.....
State.....
Trade News Pub. Co.

The Hub

Entered in the New York Post Office as Second-class Matter

Vol. LV OCTOBER, 1913 No. 7

THE TRADE NEWS PUBLISHING CO. OF N. Y.
Publishers of THE HUB

J. H. WRIGHT, *President.* G. A. TANNER, *Secretary and Treasurer.*
24-26 MURRAY STREET, NEW YORK.

Other Publications of Trade News Publishing Co.:
HARNESS (monthly).....per year, $1.00
AMERICAN HARNESS AND SADDLERY DIRECTORY (annual).....per copy, $4.00

THE HUB is published monthly in the interest of employers and workmen connected with the manufacture of Carriages, Wagons, Sleighs, Automobiles and the Accessory trades, and also in the interest of Dealers.

Subscription price for the United States, Mexico, Cuba, Porto Rico, Guam, the Philippines, and the Hawaiian Islands, $2.00, Canada, $2.50, *payable strictly in advance.* Single copies, 25 cents. Remittances at risk of subscriber, unless by registered letter, or by draft, check, express or post-office order, payable to the order of TRADE NEWS PUBLISHING CO.

For advertising rates, apply to the Publishers. Advertisements must be acceptable in every respect. Copy for new advertisements must be received by the 25th of the preceding month, and requests to alter or discontinue advertisements must be received before the 12th day of the preceding month to insure attention in the following number. All communications must be accompanied by the full name and address of writer.

FOREIGN REPRESENTATIVES:

FRANCE.—L. Dupont, publisher of *Le Guide due Carrossier,* 78 Rue Boissiere, Paris. Subscription price, 15 francs, postpaid.
GERMANY.—Gustave Miesen, Bohn a Rh. Subscription price, 12 marks, postpaid.
ENGLAND.—Thomas Mattison, "Floriana," Hillside Avenue, Bitterne Park, Southampton. Subscription price, 12 shillings, postpaid.

Entered in the New York Post Office as Second-class Matter.

C. B. N. A. Convention

The convention in St. Louis this year ought to be well attended. If a vehicle center has power to attract, then a place of great drawing power has been chosen, and results for the membership roll ought to be good. It is a hope, earnestly expressed, that such may prove the fact, because the roll of members needs padding with plenty of new material.

It is a curious commentary on the ways of mankind, made manifest by an examination of association registers of attendance, that these meetings draw to them a large number of unattached vehicle builders, who register, enjoy the proceedings, meet friends, transact business, sit at the association banquet table, as a guest by the invitation, and at the expense, of some financially interested host—but never join the organization that has made these opportunities possible.

This year the oft tried experiment of closing the exhibition hall during sessions of the convention is to be tried out still another time. Heretofore the populace could, with much effort, be driven from the market place, but the line of least resistance was never in the direction of the meeting room.

We believe such plans will never be crowned with success so long as the association approves the issue of a daily report of the proceedings. This ought to be plain to anyone who has acquired the daily newspaper habit, which means everyone.

The association members will meet in a community of enthusiastic hosts, and the enjoyment, the cordiality of the reception, and the good feeling will be something to long remember with pleasure.

We Are Among the Highbrows

The vehicle builder has reason for sitting back in his most comfortable armchair. He can go the length of feeling some modest pride that he is a buggy builder, and not to be classed among the alleged common people.

Recent events hearten us. His business is more than ordinarily prosperous this year. It is in marked contrast to the slump in the automobile saturnalia of profit. He sits on the shore of the sea of business, watching the tide come in, sorry, of course, that he sees cast up here and there the debris of failure that has been a melancholy event in the other vehicle industry.

His "class" is enhancing. He is getting into society. Events prove it. It has heretofore been only the privilege of the high society woman to make unstable declarations under oath of customs officers, with a view to passing in fourteen trunks filled with just trifles of personal use, and then have the whole works seized on the charge of cheating the customs, and a criminal information lodged. Only the very best people, those whose names are always at the very top of the society columns in the papers, have that distinction. So, when a lady associated with our very own does the same thing, and through the efforts of lawyers and her strenuous husband gets out of the clutch of the law by the payment of a mere paltry three thousand or so, we know, as carriage builders, we have arrived.

Then, again, we have grandsons in our trade, whose progenitors amassed much kale as sturdy farm wagon builders, now using some of the money by mixing it up with seductive actress ladies, and marrying the same, just like the nephews of czars, and the dukes, earls, counts, etc., of English undefiled. Nothing could be

higher class than this. It marks a distinct advance in social position that glorifies mere trade.

It gives a delightful and proud sensation to mark this advance in the social status As carriage builders we used to attend on such people, and open the door for them, and usher them into the repository, but no more. We are in the class. They can open their own doors!

Reducing Weight of Automobiles

We gather from news reports that makers of motor cars are finding out that a car of light weight has much merit. Many are cutting out weight, and making an advertising feature of the act.

In the horse-drawn division of the vehicle industry the merit of lightness combined with strength has long been a principle of construction, but the engineers, copyists, and leader followers of the self-propelled department of the vehicle trade have never, seemingly, paid attention to the subject.

We are of the opinion those concerned would have followed the beaten trail forever if the success of the Ford car, and its enormous money-returning quality, had not agitated the makers of models.

This must be true, because the Ford has for a long time been light and leading, while the weight producers held to their practices.

If the cyclecar makes the progress here that it has made abroad, we are likely to find that it will have a preponderating influence on the side of reduction of weight all along the line.

Should this come to pass, it will be interesting. It opens up a vista of many changes that will be improvements, and that ought to have come along before this.

We are not in the engineering class, so are not afflicted with the knowledge or vagaries of the class, but we can see the merits of what we look upon as improvements that would benefit the automobile as a useful vehicle.

We think it ought to be as practical to develop the air-cooled engine on wheels as it has been developed on wings, thus subtracting not only much weight, but also suppressing the great nuisance of water cooling.

It ought to be practical to make the circumference of the automobile wheels bear some reasonable relation to the rest of the vehicle. This improvement alone would do away with a host of present difficulties, and save a lot of erudition on the subject of springing, etc. The passenger, too, would for the first time learn the luxury of riding in a real vehicle, in place of an indigestion cure.

The lighter weight and more compact motor could then be placed in some proper relation to the rear axle, where it delivers its power, and the car skidding now so dangerous, and such a nuisance, withal, would cease to supply, free of charge, a toboggan slide for the occupants.

There would also be a sudden discontinuance of talk about upkeep, service, and such phrases, meaning that a vehicle is regarded from the point of view of a baby that must be kept in leading strings, and wet-nursed into a state of constant efficiency.

The advantages mentioned are only some of many that would come from weight reduction, and it is strange, indeed, that a trade that is all future and no past, should fall so easily into the slip-shod conservatism of letting well enough alone, under the shibboleth of "standardization."

The Technical School

The article on the Technical School in this issue has been prepared for the sole reason that there is too little information on the work of the school available to the general vehicle public.

There has always been more or less vague misinformation. There has always been a nebulous notion that it was a "good thing" and ought to be pushed along, especially at hat-passing times, but nobody seems to understand the force it has exerted for the betterment of the trade of vehicle building.

Even those who build by imitation have had to find an original model to imitate, which model has, more often than not, originally been a design from a blackboard by a draftsman who thinks.

If such original designs could be absolutely protected from imitation, the debt due the school could then be made as clear as day.

We hope we have had a little success in placing the subject in its proper light.

New Orleans Next Year?

Everyone has received a letter from Jos. Schwartz Co., limited, of New Orleans, inviting the convention to the Crescent City.

The invitation has the strongest local backing, which appears to be unanimous.

Other things being equal, it would depend on the facilities offered by the city in the way of a hall suitable for housing our exhibits.

This is the first consideration the C. B. N. A. looks to when deciding on the next meeting place.

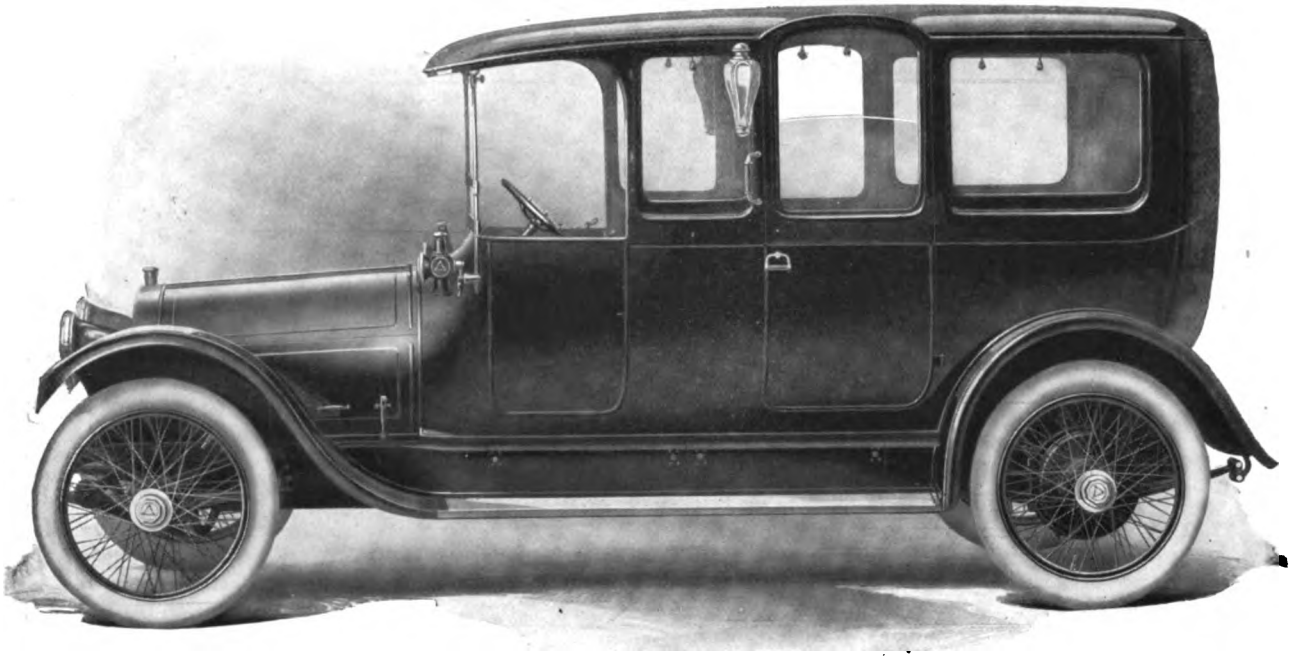
The Same—With a Difference

When Henry Second was King of France there were only three coaches in all the city of Paris. One was for the queen, one was for Henry's mistress, Deane de Poitiers, and one was used by the Lord Chamberlain.

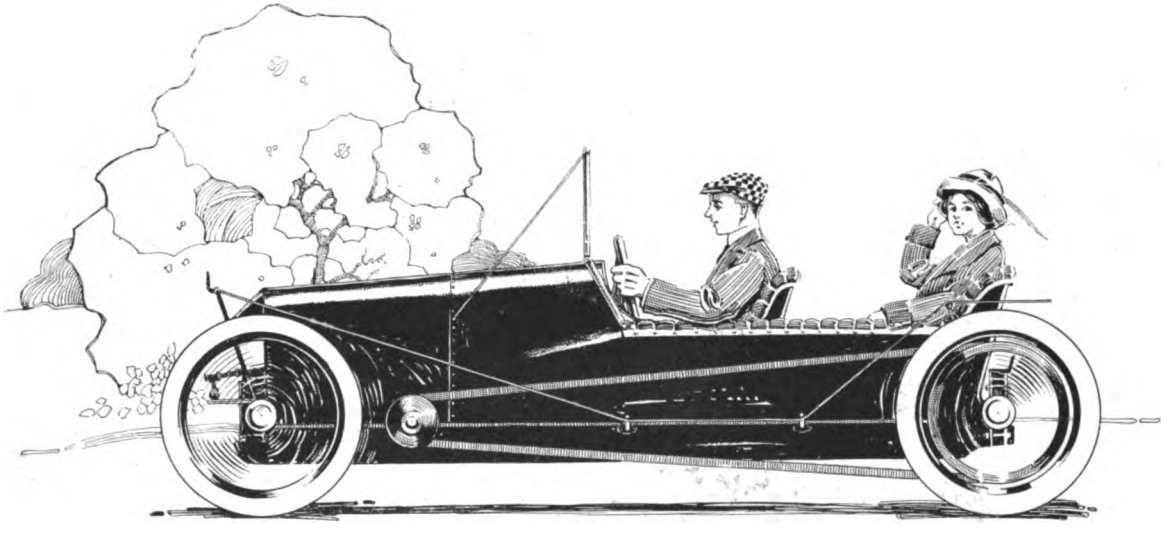
It is nearly four hundred years since that time, and yet at this day and in this time, the ownership of a really fine carriage is almost as much of a social distinction as when chivalry was young.

BUGGY COMPANY RESUMES

The James & Myer Buggy Co., Lawrenceburg, Ind., which went into the hands of a receiver in August as a result of the flood, has resumed operations under the management of George Kurz, receiver.

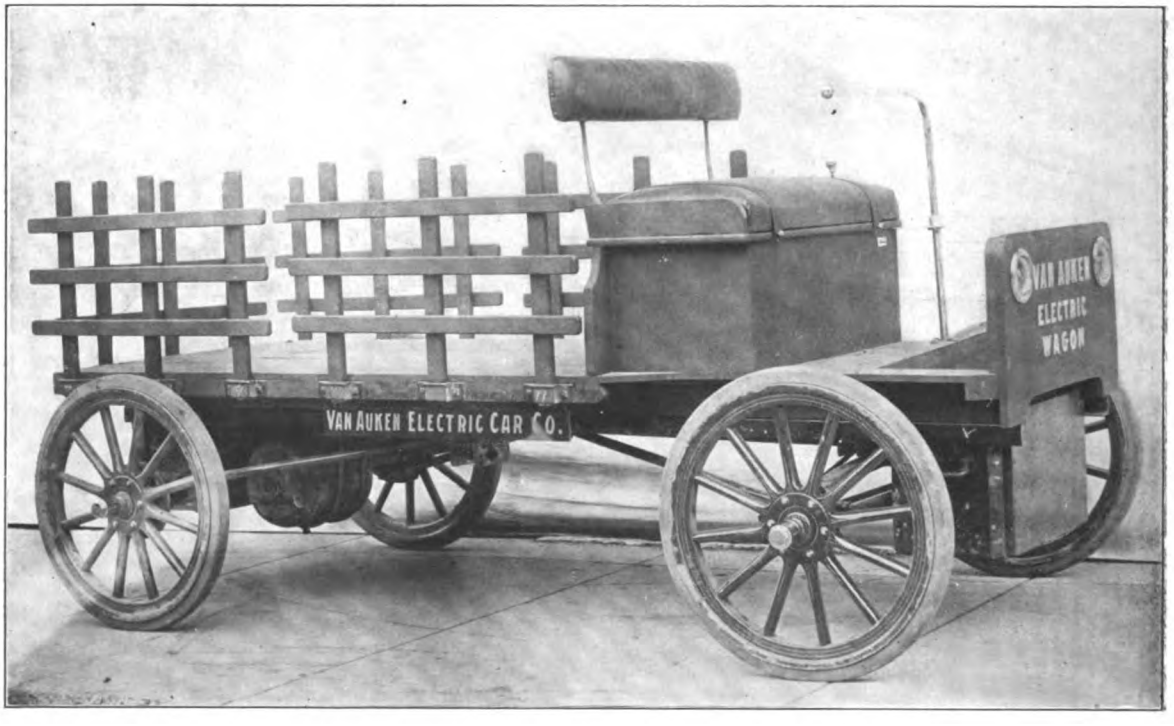


STEVENS-DURYEA LIMOUSINE
With Wire Wheels

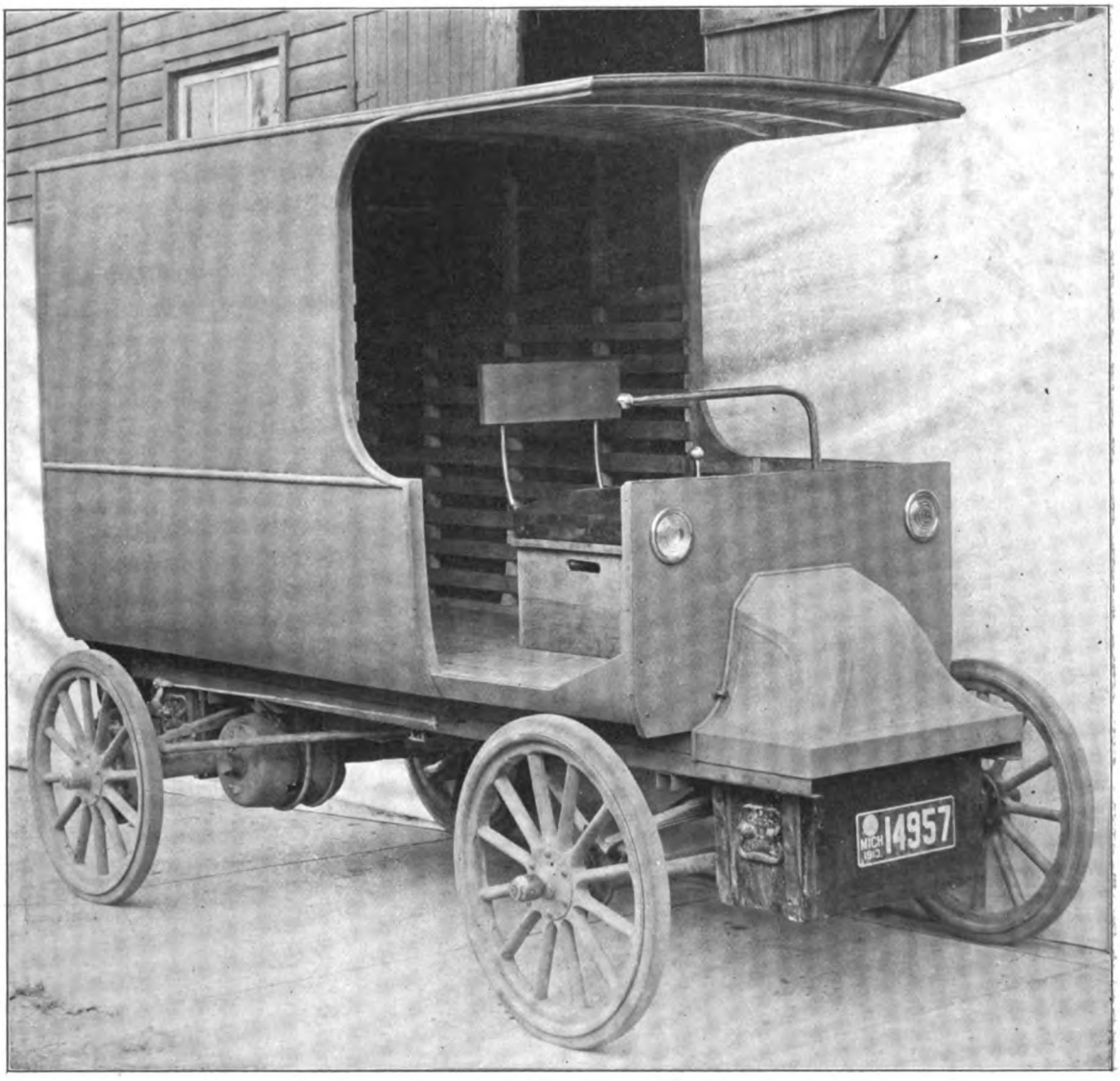


"THE IMP" CYCLECAR
W. H. McIntyre Co., Auburn, Ind.

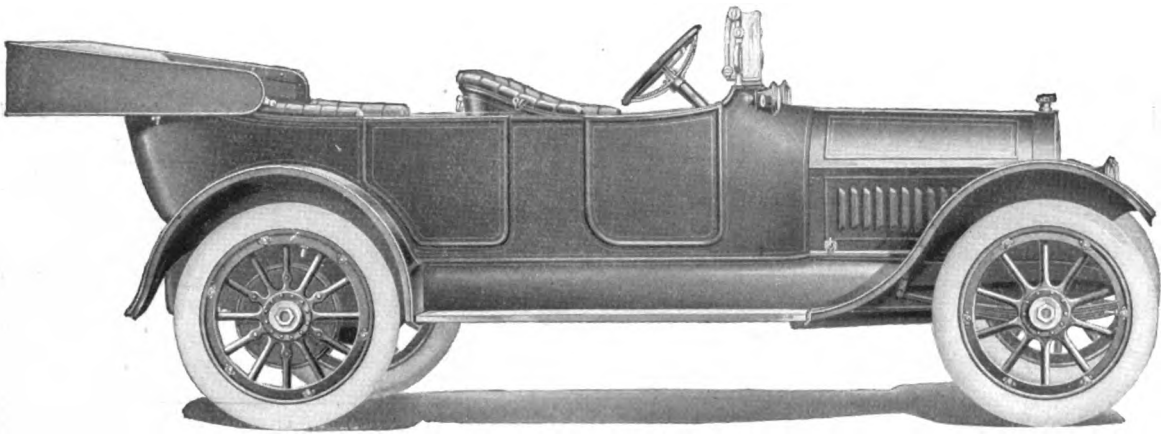
PEERLESS FIVE-TON COMMERCIAL TRUCK



VAN AUKEN ELECTRIC DELIVERY CAR

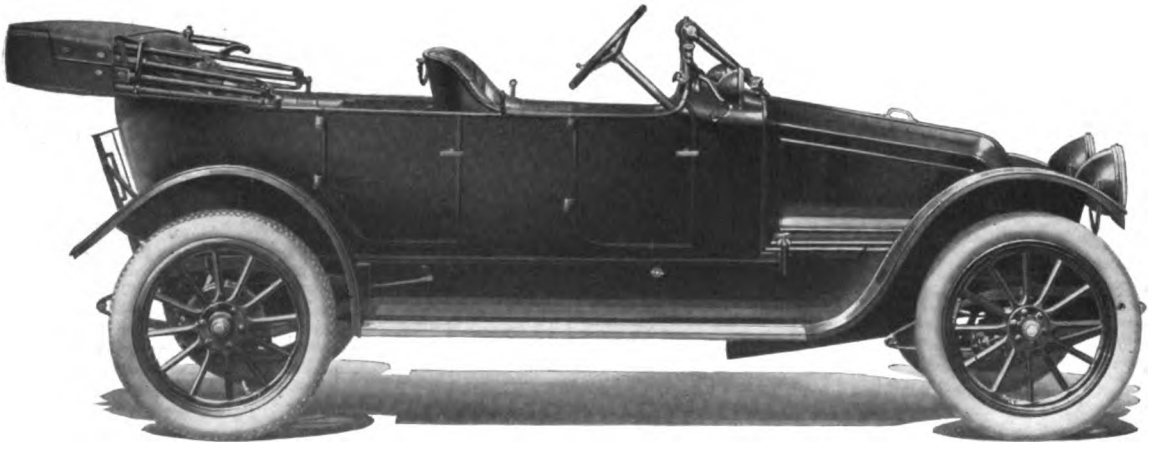


VAN AUKEN ELECTRIC DELIVERY WAGON

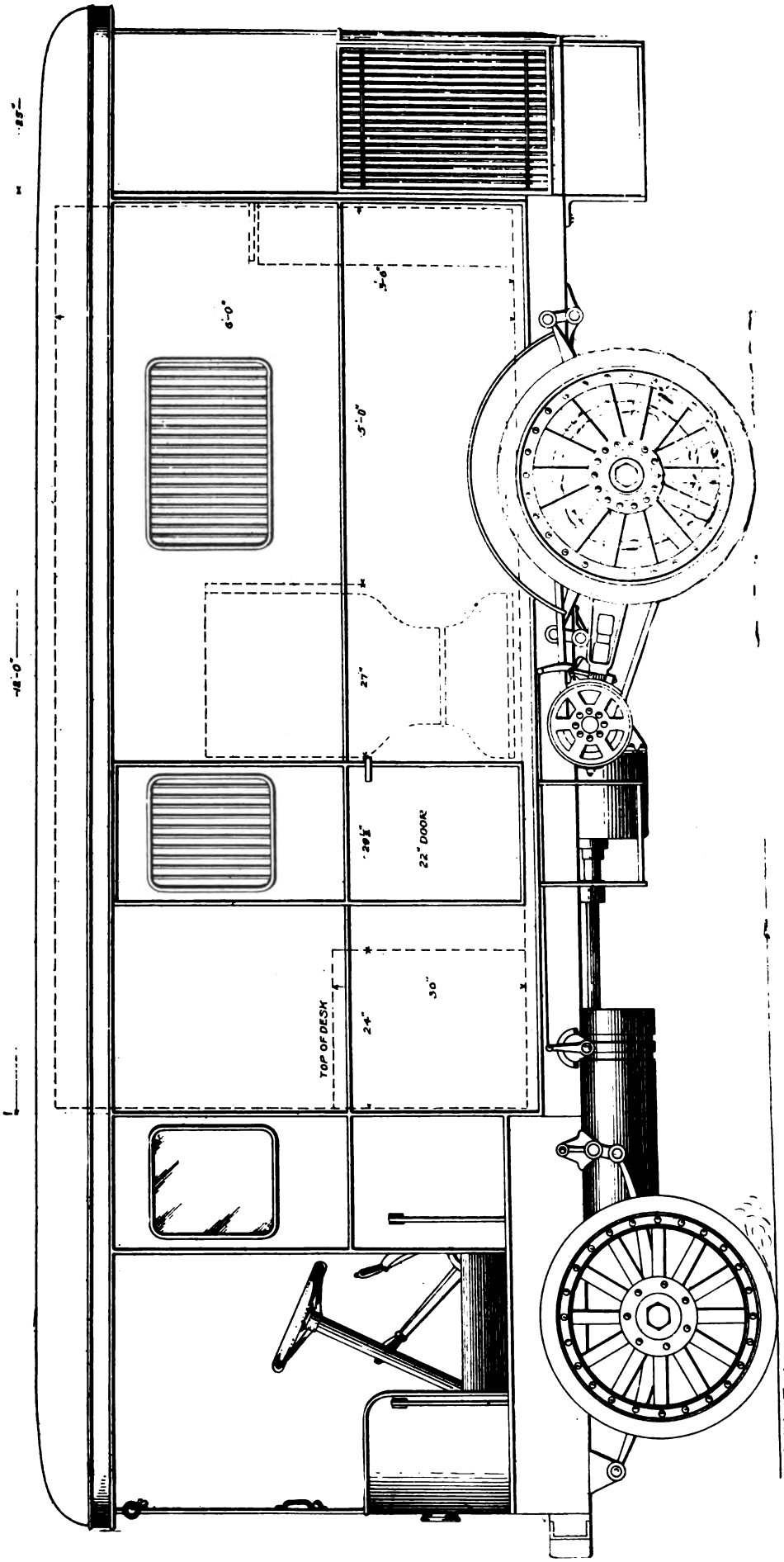


CADILLAC FIVE-PASSENGER TOURING CAR

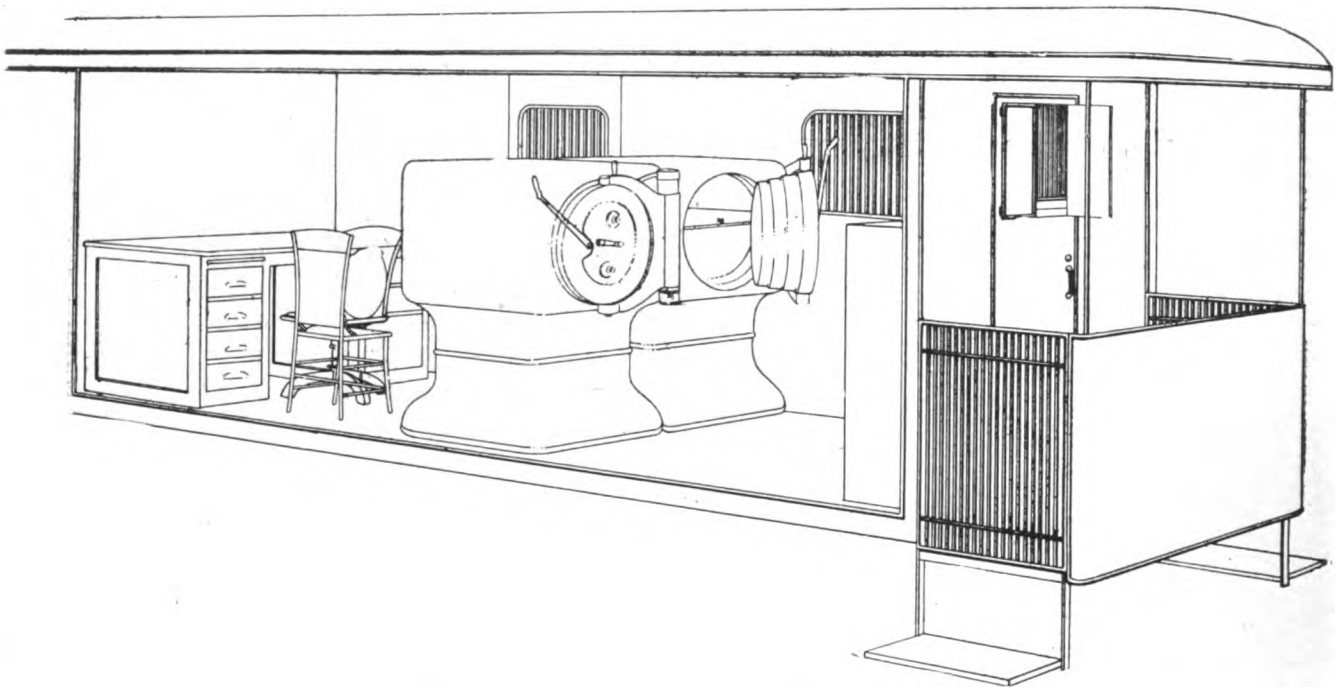
1914 Model



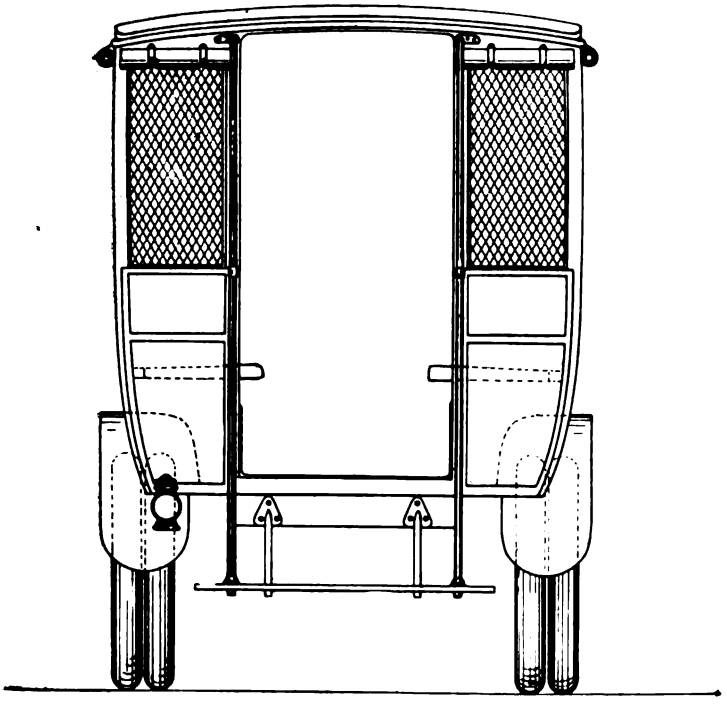
FRANKLIN SIX-THIRTY TOURING CAR



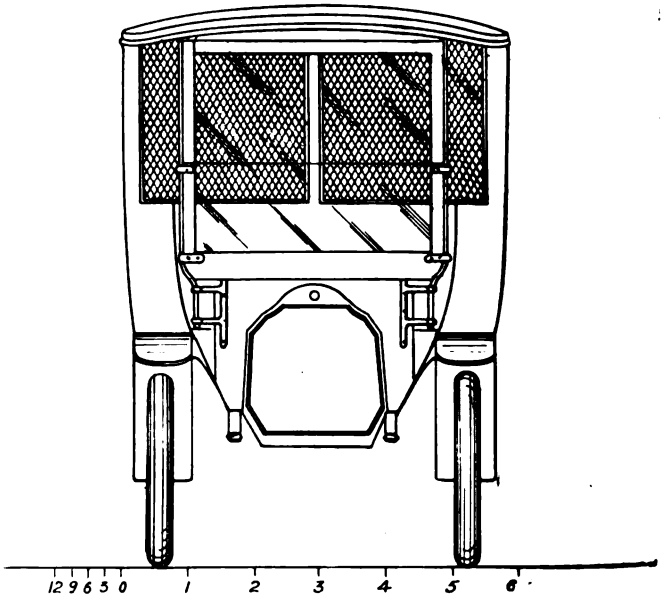
ARMORED BANK CAR, SIDE VIEW



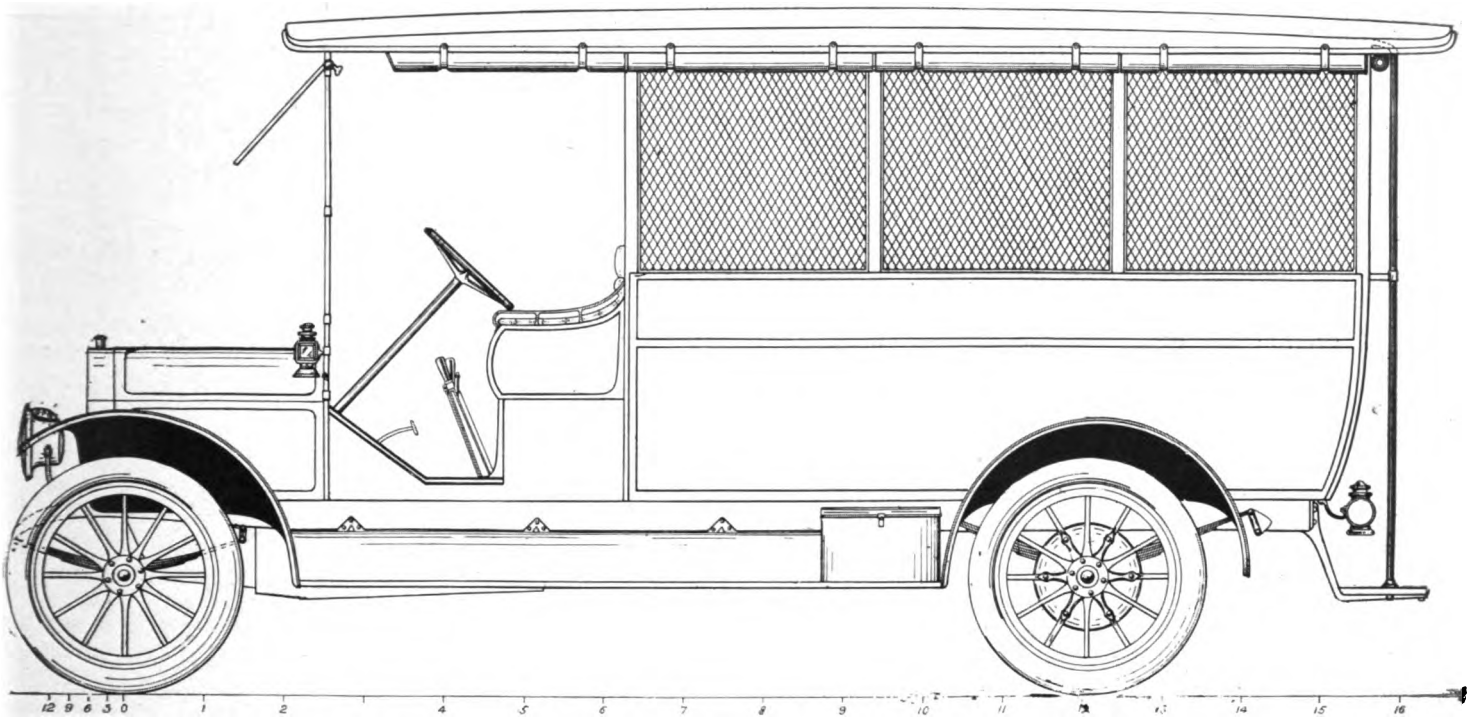
ARMORED BANK CAR, INTERIOR VIEW



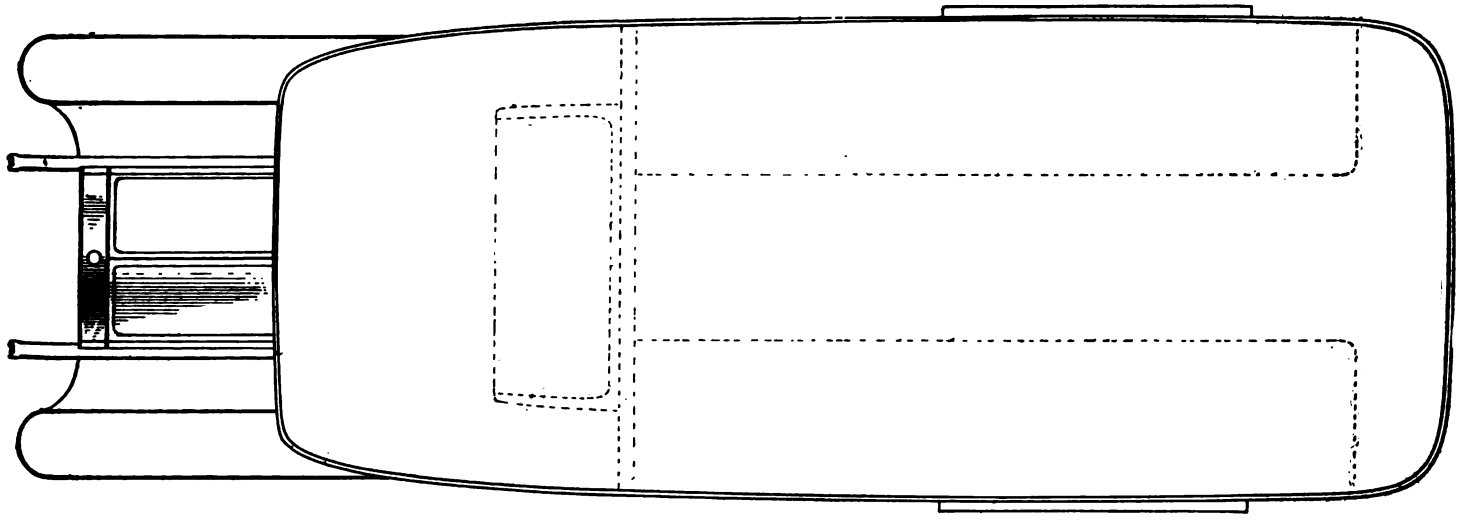
POLICE PATROL WAGON, BACK VIEW



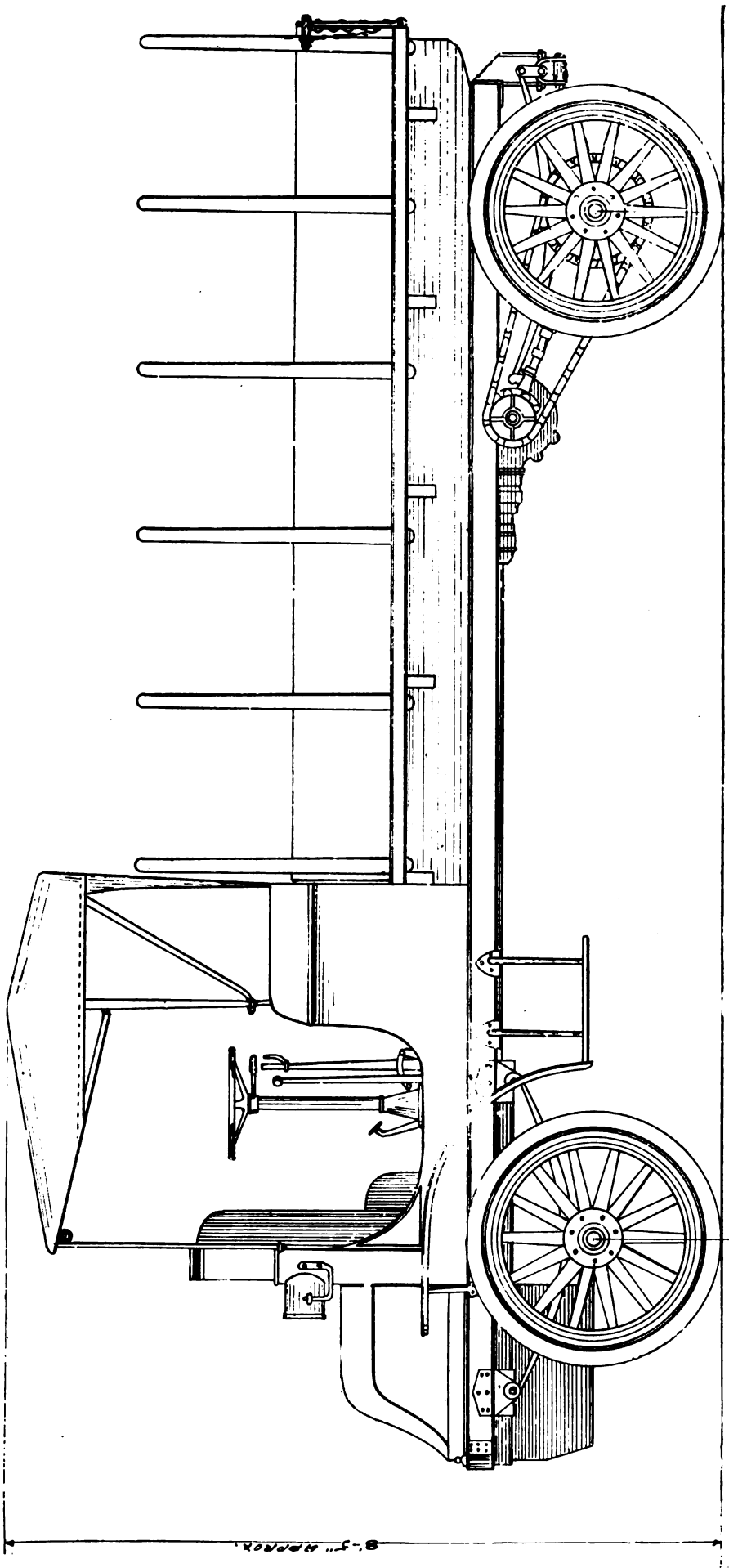
POLICE PATROL WAGON, FRONT VIEW



POLICE PATROL WAGON, SIDE VIEW



POLICE PATROL WAGON, TOP VIEW



STAKE BODY HEAVY COMMERCIAL CAR

THE OCTOBER OFFERINGS

Stevens-Duryea Limousine

The Stevens-Duryea Company, having experienced the difficulty of securing in the open market enclosed bodies meeting their exacting standard, in beauty, construction and finish, erected at East Springfield new buildings in which to manufacture their open and enclosed bodies to prevent the slighting of the smallest feature. The elegant simplicity of the exterior and interior finish is easy to recognize, but difficult to define. There is not a piece of exposed wood in the construction of the entire closed body; a combination of cast and sheet aluminum is the material which serves as a covering for the wood and steel reinforced frame. There are no surface joints or nail holes penetrating the surface of the body; it is one continuous piece of metal from door to door. The graceful curves which give such a beautiful effect, are only possible with the jointless construction.

The scrupulous care given to minor details is shown in the use of an aluminum trough around the top of the closed cars. This gutter has such a slope that the water is carried rearward and forward rather than collecting over the door openings. This feature is an exclusive one of the Stevens-Duryea Co.

Of practical and utilitarian value are the large sashless railway type of windows. The large window areas of the limousine and berline give one a great range of vision making the interior light and cheerful. The large closed windows are of the full view type. The windows of the doors and between the driving and passenger compartment are also of the sashless type and are operated by a balancing device which automatically holds the window in any position from fully closed to wide open, dispensing entirely with complementary holding attachments. They are also self locking when closed.

On the interior the upholstery is deeply tufted, the material being selected from imported Bedford cord with the option of heavy fancy and plain body cloths, the lace and silk curtains being in harmonizing colors and of hand worked patterns.

"The Imp" Cyclecar

The Imp cyclecar is the latest addition to the fast increasing number of American cyclecars so far announced, and hails from the McIntyre factory, at Auburn, Ind. This car is a 10-12 h.p. tandem-seating, friction-belt drive car with all the possibilities of a big car in speed and reliability, and yet sells for $375 with starter, lamps and horn.

The car, while following motor cycle practice in the final belt drive, adopts the very simplest car features in the friction gear for change speeds. While this type of drive has made good in big cars it has a double advantage in the cyclecar where the motor speed is higher and the disks small as a result, and where the belt drive to the rear takes out any danger of overloading the friction wheel. The belts to the rear are of the V type of extra size and strength, and exceptionally long, so that long life is secured in the belt, less tension is needed, and 10,000 miles should be done on one set of belts. The principal feature of the drive, in fact, is the long belt idea.

The motor is of the V type commonly seen in motor cycles, but fitted with a heavy outside flywheel and friction disk combined, and a special carburetor for slow running.

The most important features needed to allow speed on cycle cars are low weight and correct springing. The Imp cyclecar has the weight very low down, the ground clearance being eight inches, but the frame being underslung and all of the driving mechanism at either side of the body instead of underneath, the riders sit comfortably in the position taken in racing cars seated but 16 inches from the ground itself. The car can be tipped at a 45-degree angle with passengers in without upsetting. No big car is less likely to tip than the low type of cyclecar as often has been proved abroad.

The springing system in the new car is unique. The car has no axles but has instead two flat springs set crosswise of the frame, and fastened at the ends to yokes, between which the wheel spindle is fitted, in front to a pivoted steering knuckle, in back to a rigid arm. Thus the weight of the car is directly on the springs and the only unsprung weight is the wheel weight. The springs are very resilient and easy, as allowed by the tandem seating, with all the weight in one line whether one or two ride—not the case with the side-by-side arrangement.

Steering is accomplished by a steering wheel in the center of the car, the post running to the front and ending in a bobbin, around which run steel cables to the steering arms of the front knuckles, a spring keeping them taut as shown. A tie rod across the front connects the arms. This steering is very easy and almost irreversible, as much so as the most expensive constructions on the market today.

The controls work from the wheel as is usual, the gearshift lever being in the center of the car just under the wheel, and pivoted in the cowl dash.

In front of the driver stretches a five-foot hood covering the power plant. On either side the car edges are upholstered and at the back the body comes to a vertical wedge point giving a fine stream line effect and decreasing wind resistance. There is space at the back for tools and spares and a small luggage space.

The car, it is claimed, will make 45 miles an hour, and run 50 miles on a gallon of gasoline. The machine has ball bearings throughout.

A Fine Peerless Truck

The illustration of Peerless five-ton truck made for Baugh & Sons Company is an argument for commercial car trade stability. It is the makers of tried material, at prices in accord with sturdy service, backed by a service proposition that may be called upon and relied upon, that is the promise and hope of this side of the motor business.

We present this as one such example among many from the shops of the Peerless Motor Car Co., of Cleveland.

Van Auken Electric Delivery Wagon

The Van Auken Electric Car Co., of Connersville, Ind., is making a tiptop service electric automobile of 750 pounds capacity that is low enough in price to meet ordinary commercial requirements.

The wagon gives to its owner practically unlimited service. Continuous operation can be had by purchasing additional batteries. This permits of charging batteries in relays. The only time that the wagon need be idle is while batteries are being exchanged.

Ease in loading and unloading is most important. The platform is 30 inches from the ground—just the right place.

Low maintenance is obtained by elimination of uncalled for wear and tear. The maximum speed of twelve miles per hour lessens vibration. Friction is minimized. Most careful thought has produced the design which gives easy accessibility to all parts. The simple, staunch construction built upon this design uses no unnecessary parts. The material used gives the wagon long life with a maximum of strength and minimum of weight and upkeep is therefore held down to the limit.

The New Cadillac

An electrically-shifted two-speed rear axle constitutes the chief element of newness in the new cars of the Cadillac Motor Car Co., of Detroit, Mich.

In adopting the two-speed rear axle, the Cadillac company has made a serious attempt to reduce fuel consumption, and it is an attempt that bids fair to accomplish its ends. In place of the usual single bevel drive there are two bevel drives, one of them giving a final gear ratio of 3.66 to 1 and the other a ratio of 2.5 to 1. The lower gear ratio is suitable for city driving or for use on rough roads where the maximum of flexibility without the necessity for shifting transmission gears is desirable; and for driving at greater speed in the open country and where the roads are fairly good the higher gear

can be called into use by the simple depression of a conveniently located button.

Just what saving in fuel consumption can result from the arrangement can be better appreciated from the statement that the high gear ratio permits a 42 per cent. increase in the speed of the car for a given number of engine revolutions to the minute. Thus, for instance, with the engine turning 700 revolutions to the minute, the speed of the car on the lower of the two gears will be approximately 21 miles an hour; with the higher gear ratio in use, on the other hand, the speed of the car, without any increase in engine speed, will be approximately 30 miles an hour. Consequently, in a given time, and without any alteration in engine speed, the car will travel considerably further when running on the higher gear than it will on the lower one. This feature, which is a vital one what with the comparatively high cost of fuel, is in addition to a substantial lessening of wear in the parts due to their slower speed when the high gear is used, and also results in considerably lessened engine vibration at high car speeds. The arrangement of the bevels, which is beautifully simple, is shown quite clearly by the accompanying picture, which also makes plain that the axle is of Timken construction.

In the lighting and starting equipment two alterations have been made, not the least important of which is a material increase in the cranking speed of the electric motor. Probably the next most important change is the substitution of a single-wire circuit for the double-wire circuit. By this means the wiring has been simplified. Also, there now is an automatic temperature regulator on the voltage regulator, and this, with the cut-out relay, and the battery ignition relay, are contained in a box attached to the forward side of the dashboard under the hood.

The controlling switch on the generator has been eliminated and its functions now are performed by one of the brushes which is so interconnected with the clutch pedal that when the pedal is depressed to bring the cranking device into action the brush is brought into contact with the motor commutator and is removed from it when the clutch is released after the motor has started. When the brush is brought away from the commutator, auxiliary contacts are closed which bring the battery charging generator into operation automatically. Another electrical device that has been added is an electrically heated vaporizer in the carburetor to facilitate starting in cold weather. Incidentally, the poppet type air valve has been replaced by a swinging type valve and the special auxiliary air inlet has been eliminated as unnecessary.

In appearance, the car is much like its predecessors, except that it is driven from the left side—all previous Cadillacs have had the steering wheel at the right side—with the control levers placed in the center of the footboard. The steering wheel itself, by the way, is different from anything else of its kind; it is hinged and may be turned down, parallel with the steering column, to permit easy entrance to the driver's seat; also to remove obstruction, the right side front seat upholstery is hinged and may be turned up out of the way of entering passengers.

Seven bodies in all are supplied on the single chassis; they are five and seven-passenger touring, roadster, four-passenger phaeton, three-passenger landaulet-coupe, five-passenger inside-drive limousine, and seven-passenger standard limousine.

An Armored Bank Car

The accompanying illustrations show a steel armored car that is designed to be used as a bank and pay car. There are two compartments; that at the rear is for the paying teller and the safes, of which there are two, open into this room. The rear platform is made in the form of a vestibule, and the two gates at the sides open inward. It is designed that when the men are paid off, they file across this platform one at a time, entering by one gate and leaving by the other and taking their envelope from the barred window. The entrance to this rear compartment is through the door from the platform and all the door locks and shutters are protected by electric alarms.

The forward compartment is used as an office for consulting and for bookkeeping, and the entrance to this is from one side door and the safes form the division that makes the two compartments.

The entire interior is lined with steel as well as the outer sheeting of the car being of the same material, and the dimensions of the body are indicated by figures on the drawing.

The capacity of the car is three tons and the safes weigh each 2,000 pounds; they are cast steel and are made for the purpose for which they are used.

The demand for this type of car is on the increase with large factories that are removed some distance from the bank and located in isolated places. By the use of this car the money can be drawn on pay day from the bank and retained in the car till paid out and the office accommodations will permit of the clerical work also being arranged without the employes leaving the car.

Police Patrol Wagon Body

These illustrations of a police patrol represent the latest in this type of car and are a reproduction of that used by New York City, quite a number of which are in daily use. The capacity of the body is for twelve inside, or six on each side, and the chassis is 1½ ton, 145 inches W. B., and the rear wheels are dual 36 x 4½ inches, while the speed of the car is equal to 50 miles per hour.

The body construction is entirely of wood, and the seats and seat backs, as well as the front of the body to a level with the seat backs is formed of ash strips, with a space between so the interior of the body can be flushed out without damage. These seats are arranged to be swung up, being hinged at the back, so that the floor of the car can be used for an ambulance, and a stretcher is at all times carried under one of the seats. When the body is used for ambulance purposes the attendants stand on the step at the rear; two brass handrails are placed at the rear to be used for holding on, and, in addition, the roof is made to extend over the step and serves as a cover for those making use of the step. There is no door, but on each side of the opening there is a wire mesh between the pillar and up to the roof, and this mesh is also on the sides and at the front. Outside of this are rollup curtains to keep out the rain, and the driver is protected with side curtains and a glass windshield. The floor of the body is covered with heavy linoleum and this is the only particle of upholstery used in the interior of the body. The woodwork is finished in natural color and the runboard step is also covered with linoleum.

The main dimensions of the body are: Length, from back of body at top to front of post at driving seat, 112 inches; width over all, 70 inches, and height inside from floor to under roof, 70 inches; width of door opening, 32 inches. The lighting of the interior is by one large dome light that is covered with a wire mesh. The front or driving seat is upholstered with black leather, and is comfortable without being too thick for the purpose of this type of vehicle.

The design is suitable for ambulance purposes, as it is an adaptation of the old horse-drawn wagon, with modifications and improvements to suit the larger usefulness to which this car with larger power and possibilities is capable.

The Franklin 6-30 Touring Car

Every provision has been made on the new series six-thirty to secure a car for comfortable use. The long wheel base and wide tread give plenty of room for a spacious body. All seat frames are set on an angle so that the cushions can be made as deep at the back of the seat, where they are really used, as at the front. The weight of the car has been reduced to the minimum throughout, giving perfect riding ease and extreme economy of operation.

To obtain the clean, unbroken body lines and to make the running boards of greater use, everything has been removed

from them, although the tool box is just as handy, being located between the inner edge of the running board and the sill, folding down on the running board when open.

The steering wheel is located on the left hand side of the car and the transmission control and emergency brake levers are in the center, so located as to be easy to operate and that the driver can enter the seat from either side. The car is electrically lighted throughout.

The combined starter and magneto switch is located on the dash within easy reach of the driver. The Entz electric starting and lighting system, which is used, makes it impossible for the motor to stall. For protection purposes all lighting switches are located in a box dividing the two front cushions, except on the roadster and coupe, where they are located on the heel board of the driver's seat. In this box also are holders for five extra light bulbs, resistance for electric horn and resistance for dimmer.

The beauty of design is carried out in the motor, which is finished up in a clean, neat manner with all parts above the engine deck nickel plated, while all parts below, except the aluminum parts, are black enamelled. The Franklin direct-cooled motor insures highest efficiency in gasoline consumption and entire freedom from freezing and overheating troubles.

The enclosed bodies on the chassis are superior in every detail. Every convenience in equipment is embodied, luxurious deep upholstery and complete interior appointments. Interior metal finish is in silver. The standard color on the new series is Brewster green with black trimmings with all lamps black and nickel. The Franklin Automobile Co. is to be congratulated on a fine job.

WINDOWS

For some time past considerable attention has been devoted by body designers to the improvement of windows and methods of operating them.

As cars increased in size windows also increased proportionately, both in size and weight, and as, at the same time, speeds tended to increase, it became a matter of no little difficulty to fit windows free from rattle.

In horse vehicles it was customary to cover the frames with velvet, but such material on the heavier windows of motor cars, working in wide channels, could hardly be expected to withstand much wear. The difficulty was met, so far as the closed position is concerned, by designing various forms of screw or lever "pressers," attached to the door frames, and to provide for intermediate positions other forms of spring pressers were arranged to be fitted in the runs; but in the confined space available it is not so easy to get any fitting of sufficient strength, especially in the case of large undivided front lights, and the difficulty with all such fittings is that oftentimes they themselves develop into a source of noise.

Frameless windows have recently acquired a considerable vogue.

Auxiliary metal channels, lined with velvet, are now generally used, the glass sliding in these with just sufficient friction to ensure easy, but not too easy, motion.

In the case of a framed window sliding in a wide run it is clear that even with a heavy turnunder the window had room to adapt itself to the curved shape, but with the frameless glass, fitting closely in its metal channel, the motion must be in a straight line. If the metal channel is made in one straight piece from top to bottom it is obvious that the window cannot be pushed over the fence-plate, and in this example the fence-plate is dispensed with in favor of a rubber strip. But the water-tightness of this arrangement was not—in the days of its first introduction and before the advent of the further improvements considered satisfactory, hence a modification was designed, as shown by Figs. 1 and 2, in which the metal channel was made in two parts, the lower one being boxed solidly into the door frame while the upper part was suspended from a hinge pin at the top and free to swing in a widened-out run, so that the window could be pushed over a metal fence-plate in the usual way.

In both of the foregoing cases the metal channel is assumed to be straight, and the amount of turnunder possible is in that case limited. Where a heavier turnunder is required, adherence to the straight line would necessitate a heavy and objectionable

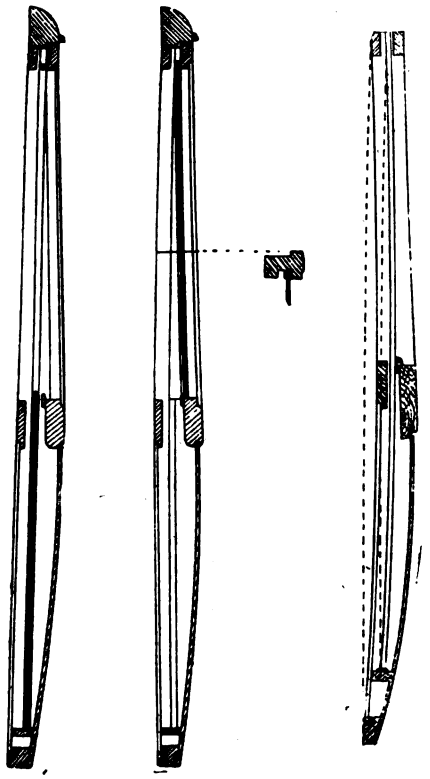


Fig. 1 Fig. 2 Fig. 3

thickness of door frame, and in order to obviate this several builders have adopted a glass and channel curved to suit the sweep of the door, as shown in Fig. 3.

It is hardly necessary to point out that the curved channel can be arranged either in one unbroken length, in conjunction with a rubber strip in place of fence-plate—as drawn—or the same system of construction can be used as in Figs. 1 and 2, with a swinging top half and a metal fence-plate. Or, as is frequently the case, no fence-plate, or substitute, is used at all, but this is open to the objection that it permits water to find its way into the interior of the door.—Cooper's Vehicle Journal.

UNPROTECTED WHETSTONE

The uncovered whetstone soon takes on a gloss from dust particles that collect on it. This smooth, glossy surface can be easily removed by applying powdered pumice to the stone just before using it. This treatment removes the grit, and the knife blade will be polished. At the same time it is quickly ground to a good edge. The powder can be kept ready for use in a face-powder can with a shaker top.

TO BRIGHTEN LEATHER UPHOLSTERY

One of the most old fashioned and, according to many who have used it, one of the best methods of cleaning and brightening leather upholstering, is to rub it well with a cloth or sponge dipped in white of egg that has been beaten up a little to prevent its being stringy, and then give it a final rubbing with a dry, soft cloth to remove all traces of the egg. The effect is said to be exceedingly satisfactory.

THE CARE OF CARRIAGES AND MOTOR CARS

One of the many problems that face the users of road vehicles is that which concerns the preservation of the finish which has been so laboriously bestowed on the carriage or motor car, and many are the methods adopted in order to retain the general appearance of freshness in the varnish.

Before the advent of the motor car, when the users of carriages were content to proceed at moderate speed, the brougham or landau was not subjected to the same conditions as now obtain with the auto car. Mud was not permitted to remain and become dry, but was removed immediately on the return to the coach house, the carriage being carefully washed and wiped dry. These old coachmen learned their business as boys under a man who had done the same thing when a boy, thus serving a kind of apprenticeship and becoming experts in their particular kind of occupation. There is no doubt that the ex-coachman with six months training makes the best chauffeur, he will keep the car in much better condition than will the man who has only had a little engineering experience.

Of course, the conditions are all against the car, the amount of grease present in the different parts of the chassis is a continual menace, and unless a separate sponge and leather is kept for body and chassis respectively, the grease is bound to be transferred from chassis to body. The exhaust smoke also spreads itself over the rear part and is extremely difficult to remove without destroying the lustre of the varnished surface. The speed at which the car travels is another factor to take into consideration. The road particles and dust strike with such force, that owing in many cases to the soft condition of the paint and varnish, they act almost as a sand blast on a piece of glass. The question naturally arises, is it necessary to expend so much time and labor on the finish of car bodies?

Would it not be better to spend half the amount on the painting and have them done up twice as often, the cost working out the same in the end?

There is much to recommend a dull finish, i. e., flat down the last coat of varnish with rottenstone and water and leave dull. Work thus flatted does not show up little imperfections of surface as does a brilliantly polished finish, therefore less expense would be incurred in the preliminary operations. The cleaning of bodies thus finished is much facilitated, the small scratches caused by the removal of the mud, etc., do not show up as they would do on the bright finish.

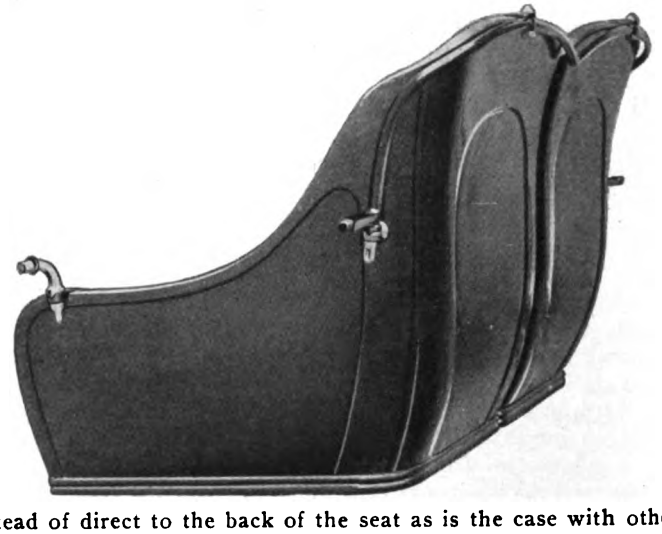
The chief object in filling up and rubbing down the bodies of vehicles is to obtain a perfectly level surface, but in view of the preceding, is the extra cost of 20 to 25 per cent. necessary? Barring the leveling properties of the filling, nothing is gained by its use. A coat or two of lead priming which possesses a certain amount of elasticity, and the color coats mixed with varnish and protected with good finishing varnish, would be much more durable than a job got up with filling to a fine surface, for owing to its hardness and non-elastic properties, it is more likely to chip and flake off. It also absorbs moisture during the process of rubbing down, which if not allowed sufficient time to dry out, is detrimental to the subsequent coats. The varnish does not hold up so brilliantly on a filled up surface on account of the porous nature of the filling, the oil of the varnish sinks into it, leaving the varnish in a grainy condition; on the other hand, when the work is commenced with elastic coats of oil color and carried out with similar coats and with no brittle non-elastic ones sandwiched in between, it must be apparent that the result would be more satisfactory in durability. A great revolution has taken place in the color schemes of motor carriages. At one time it was considered de rigeur to have private carriages painted dark and quiet colors, but now one sees all the tints of the rainbow, but for family carriages, such as limousines and landaulettes, the darker colors still prevail. The more sporting types are frequently some form of gray, of which there is a wide range, and it must be confessed they show less sings of mud and dust than the darker colors. It is not improbable that the near future will witness as many changes in ways and methods as the past, but what is wanted is courage to depart from the beaten track and keep records of such departures, so that one may stumble on something to eclipse everything hitherto tried, for without experimenting, the world of trade would come to a standstill.

NEW PATTERN SHIFTING RAIL

The illustration shows a shifting rail with new V-shaped bearings, for which patent has been applied. This rail has just been perfected and is exclusively manufactured by The Cortland Carriage Goods Co., Cortland, N. Y.

The point of excellence is the special V-shaped bearing of the rail and goosenecks, which fit into V-shaped slots or rests in the seat iron. When drawn down into the slot of the seat irons, the rail must always be tight and solid. The goosenecks must always be in the center and can never swing to front or rear. This has always been a fault of all goosenecks.

Other advantages are the simplicity of this gooseneck and rail construction. The backstays are attached to the rail instead of direct to the back of the seat as is the case with other gooseneck and prop iron constructions; the use of loop nuts make this an easy quick shift rail, and finally, the expense is much less than for a regular welded automobile buggy seat.



The Cortland Carriage Goods Co. will have an automobile buggy seat ironed complete with this new rail in its booth at the convention at St. Louis. Representatives in attendance will be glad to explain this rail, with gooseneck and seat iron attachments, to all who are interested.

The following gentlemen will be at St. Louis in charge of the booth and exhibit of the Cortland Carriage Goods Co.; Robert L. Brewer, president; Jesse Jennison, manager of sales; A. W. Curtis, A. E. Roninger, Melville Ritchie, and Marshall C. Wood, salesmen.

LARGER TIRES

The growth in the popularity of large-size tires is due mainly to the missionary efforts of tire manufacturing companies, although a powerful countervailing influence has been the larger initial outlay. The use of large-size tires is not merely a luxury, for the real fact of the matter is that the mistake was made in the early days of the motor car of using tires of too small a diameter.

We now observe that a new range of "oversize" tires is being introduced. The larger size, of course, has a greater air capacity, the rubber tread is heavier, and the walls of the tire stronger, so that, while the first cost may be higher, it is almost certain that the greater mileage obtained will reduce the cost per mile.

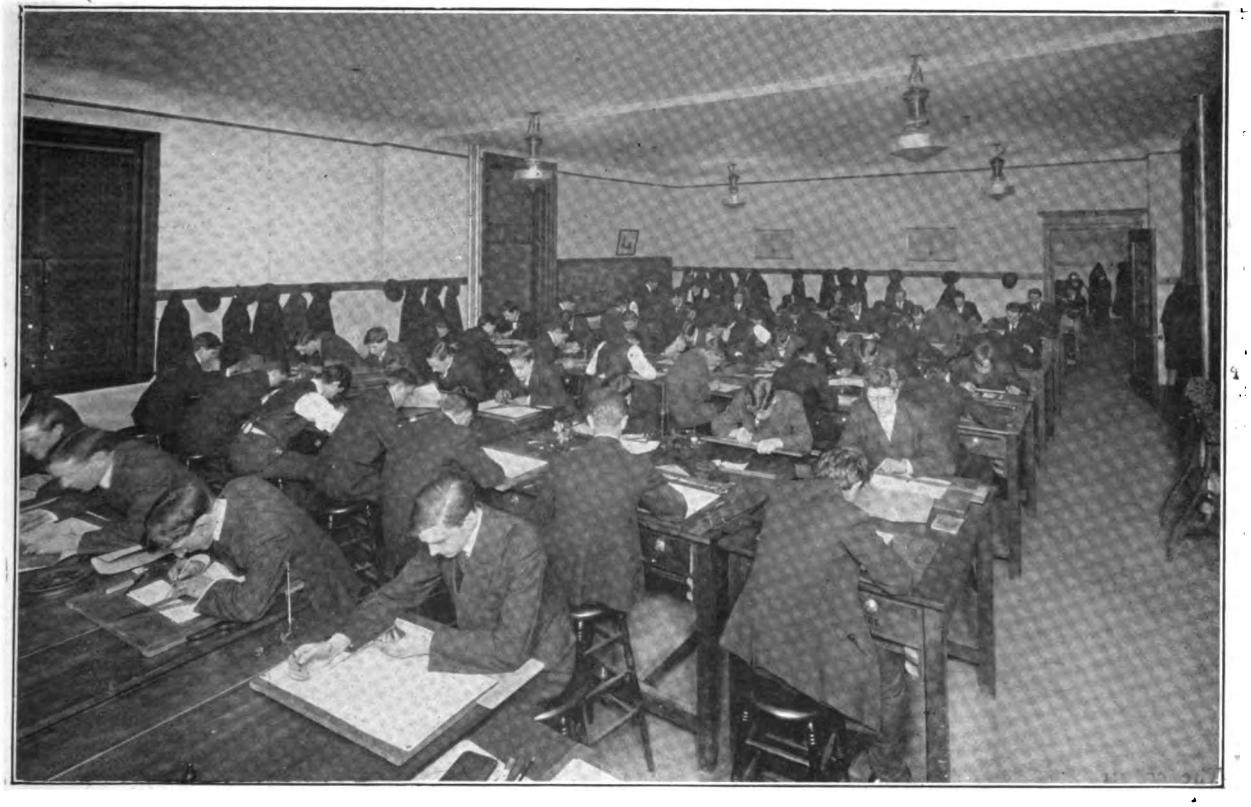
THE TECHNICAL SCHOOL

Brief History and Comparison of Advantages of the School for Carriage Draftsmen Maintained by the Carriage Builders' National Association, in Co-operation with the General Society of Mechanics and Tradesmen of the City of New York (Mechanics Institute)

Much has recently been written about the schools for carriage draftsmen to be found abroad. Deserved praise has been bestowed upon them. But we also note unfounded comparisons based on lack of information concerning our own national institution of similar character. Curiously, this want of information is found among the technical writers of American origin. It displays a mental astigmatism (imperfection of vision) that it is hard to account for. Possibly it is easier to overlook the outstanding merit of an object under our very noses than it is to see all that is beautiful in objects it needs thousands of miles of travel to look upon. Another possibility is ignorance due to lack of information, or carelessness on the part of writers.

At any rate, concisely put, we have right in New York City an American school for draftsmen and mechanics whose advantages in both efficiency and breadth of scope, have no equal anywhere. The ambitious pupil can mould himself into a complete product of scholastic influence, and has offered him means of practical development of wage-earning opportunity, not surpassed, and rarely equaled. These be brave words, perhaps, but let the account, all too sketchy, which our space affords, be its own justification. It is written with the hope that it may dispel the crass ignorance that seems to prevail among those who ought to know better, and by others who know nothing about the subject, but who should know something about it.

We will develop our story by first telling about the practical work of the Technical School, then follow with an account of the supplementary advantages offered by the Mechanics Institute (of which our school is an integral part), to such pupils as desire that all-round finish that makes an one hundred per cent. efficiency workman.



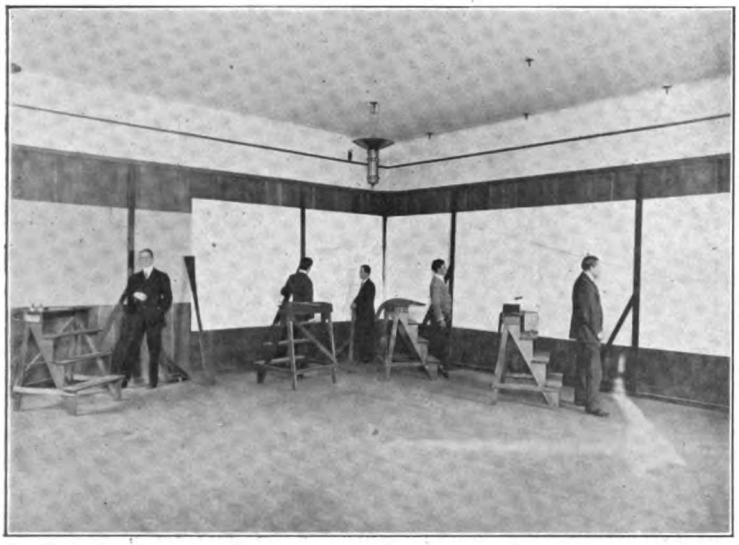
Mechanical Drafting Classes at Work

It is nothing our school plumes itself upon, but it is worth mention for the benefit of those who are never impressed unless a fact is stated in dollars and cents, that graduates from our school glide into most profitable positions, several thousands a year being some of the figures mentioned, and this very soon after graduation. Without wishing to be invidious in comparison, we would like to have pointed out to us a foreign school that can match the record. It is about time that

some of our stupid contemporaries learn what the American vehicular trade possesses in the matter of a training school, and become proud of it.

Plan of the School

The plan of the school is to teach its students to make designs and working drawings, both to scale and in full size, also fashion plates in perspective and in color, of carriages, wagons and automobiles; that is, to take young men from the



Class Rooms, Showing Extent of Drafting Boards

shops and offices and fit them to take positions in designing rooms and drafting rooms if they wish to enter them.

Curriculum

When men enter the school without any experience in drawing, they are given the following course of study, but draftsmen, and others with some experience in drawing, are given whatever they most need.

The novice is first given free-hand drawing, as that is of the greatest possible value to men in our line of work where beautiful lines are demanded in the finished product. The second step is projection drawing, showing the representation on the different planes of projection, of certain forms familiar to our trade, such as parts of bodies, and the bodies complete.

The third step is studies of plane surfaces in space inclined to the planes of projection, such as the inside faces of pillars, bottomsides, sills, etc., also dihedral angles, and the cutting of shoulders of cross bars to meet the side surfaces which are inclined in two directions when joining the two sides of the body together, generally known as the study of inside surfaces.

Fourth—Outside surfaces and their generation by means of the turn under sweep and the side sweep. This very important subject is taught with special care and thoroughness, and the students are required to develop every kind of curved surface likely to be met with in their work.

Fifth—The construction of body drawings from blue prints and templates, first to scale and afterward to full size, using drawings and templates as they did for the scale work.

Sixth—Gear making, which is taught in the same way as described above in the case of bodies.

Seventh—Original work by the students. The designing of the complete vehicle, and making the working drawing, first to scale and afterward to full size, and developing the surfaces of the wood parts, and the panels for the metal workers such as cowls, wings and other parts, and making working patterns for the same. This matter of developing surfaces is gone into with much care as it is a very important subject. There are numerous studies illustrating the different forms, and models to suit, so that the student is always sure of his ground.

Eighth—Studies in draft and suspension, with problems in both to be worked out.

Ninth—Studies in shade and shadows worked out on drawings in first angle projection.

Tenth—Studies in perspective with problems to work out.

Eleventh—Perspective in the modified form, usually adopted by vehicle draftsmen.

Twelfth—Colored drawings, using both water colors and indian inks.

Graduates are supposed to be proficient in the before mentioned subjects, and they are drilled especially on the constructive parts, and in the original work where they make their own designs and the detail working drawings from them. Incidentally, the students are taught the value of an appropriate color scheme for the vehicle throughout.

Equipment

In the matter of large wall boards for full size drawings, our school is probably better equipped than any other of its kind, as **there are five boards with an aggregate surface of 1,100 square feet of smooth board.** This is very important in any school of this character, as the final test of a draftsman's ability and his value in any vehicle business, is in making designs and working drawings to full size. The student pins his large sheet of paper to the board and proceeds to design the vehicle to full size. This sometimes requires a sheet 6½ feet wide and 16 or 18 feet in length. After sketching his design lightly in free-hand, he selects templates from the lot always kept at the school, and after finding one to fit a portion of his design, he draws a clean, sharp line, using generally indian ink for the outlines of the design. There is, of course, a complete outfit of large squares, straight edges and beam compasses for this work, so that a number of students may work at the same time. There are also numerous models, both in full size and to scale, in wood and iron, to assist the students to grasp the subject taught. There is also a complete set of body makers' tools with bench and vise, where students may mark out any pieces they choose. Some students have constructed complete body frames from their own designs and drawings in the school.

The requirements for graduating from this school are high,

One View of the School Room, Showing Its Adaptability to the Work

as, note the following from the prospectus: "The following conditions govern the graduation of students. No student will be entitled to a certificate of graduation unless he can pass, in the judgment of the trustees, a satisfactory examination in all the branches taught. He must, upon examination, evince a thorough knowledge of geometry as applied to carriage build-

ing, known as the French rule of drafting; show facility in making free-hand drawings, be able to make scale and full sized working drawings of carriages, wagons, and automobiles; be able to give the proper sizes of light, medium, and heavy vehicles, and be able to write clearly and correctly orders for such parts as are made by special manufacturers, such as wheels, axles, and springs, and be able to work out the problems connected with draft and suspension. A knowledge of perspective and colored drawing is also desirable."

These examinations take place each year in the school rooms at the close, or near the close of the winter term, and are conducted by the Board of Trustees. The school has been fortunate since its beginning in having for its trustees some of the best men in the Carriage Builders' National Association. These gentlemen are the immediate managers of the school and direct its policies.

The day school was opened as a regular department in the autumn of 1892 when the present instructor took charge. The corresponding department was made continuous at the same period. At that time the school was housed in the Bowery in one room 30 feet square, and the only surface for full size drawing was one board seven feet wide and twelve feet long. The remainder of the equipment was on the same meager scale. Through the initiative and energy of the managers, the school has reached its present commanding location, size, and equipment and is still growing.

The school is now located in one of the best quarters of the city of New York, in a building devoted to the purpose of education, where there is the best possible light for both day and evening work. Since the school has had its home in the Mechanics Institute our students may take up, in addition to our own studies, and free of cost, any subjects taught in this great institution, such as decorative design, clay modeling, physics, industrial electricity, machine design, etc. All students in our school, both day and evening, receive instruction absolutely free of cost.

Results

Ninety per cent. of the graduates are holding responsible positions in the carriage and automobile trade and the demand for men trained there is constantly increasing.

In two great expositions, work shown done by students received a gold and silver medal and diplomas.

In nearly every large vehicle factory in the United States and in Canada, one or more graduates may be found, and generally holding good positions.

Correspondence Department

The correspondence department of this school is a potent factor for good in the trade. As stated elsewhere, this department is kept open the year round and is a splendid opportunity for any and all men in the vehicle trade who can not conveniently attend the day or evening classes. There is a small charge to students in this department to meet the cost of printing and postage. Men may attend to their work as usual and, by giving a few hours each week to the study, for a year or two, may become larger wage earners and more contented workmen. Hundreds of men in our trade scattered over the United States, Canada and other countries, have availed themselves of the privileges of this department, and hundreds of others not enrolled as students have been benefited indirectly.

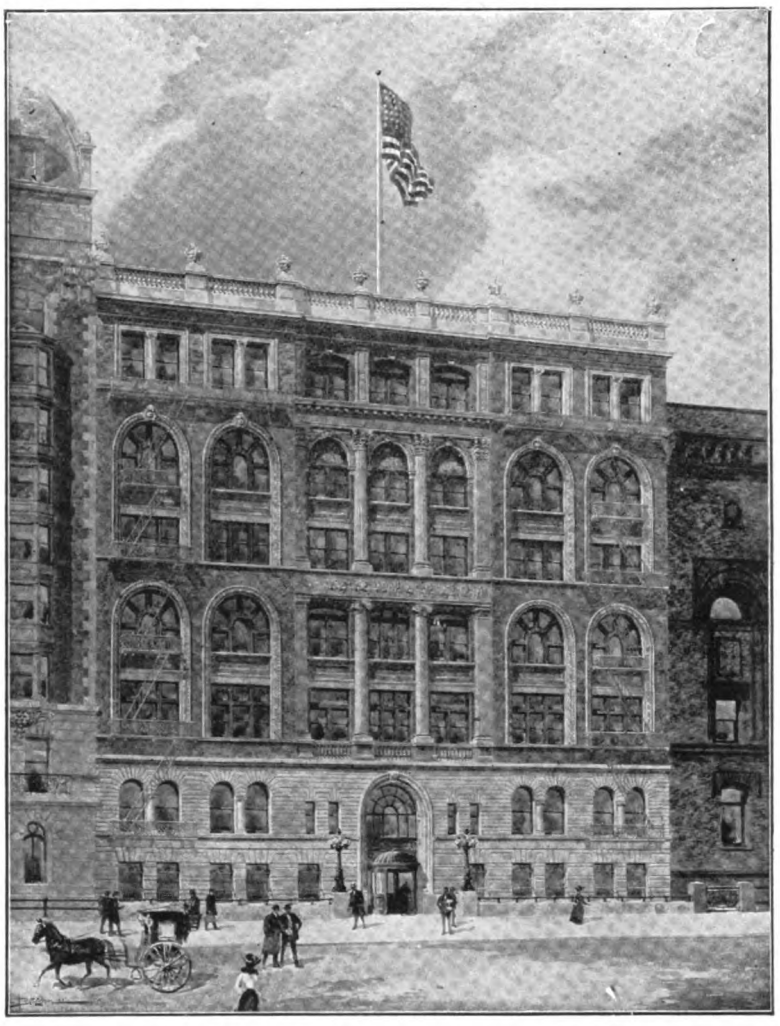
The gentlemen who have been emphatically responsible for the emphatic success of the school and its teaching methods, and for its financial repose, have always been the liberal-minded trade leaders, who have given of their valuable time, and what is as good, their earnest attention and untiring supervision, most generously.

Why go back to such a leader as John W. Britton, because we should only have to name all the big men in the vehicle trade. Let us rest at the present. Look at the trustees of the school today.

Charles J. Richter, retired partner of Brewster & Co. A man of wealth, who gives of his time and profound knowledge of the industry without stint.

Hon. Franklin Murphy, head of the great varnish house of Murphy & Co., and an ex-governor of New Jersey.

W. W. Ogden, head of the house of Quimby & Co.; Daniel



Mechanics' Institute, Home of the Technical School

T. Wilson, of Flandrau & Co., and so long the able and popular chairman of the C. B. N. A. executive committee, as well as an ex-presient of the association; W. R. Innis, of the Studebaker Corporation, and secretary to board of trustees.

Among the honorary trustees are Charles Clifton, of the Pierce-Arrow Motor Car Co., and Herbert E. Rice, of the Waverley electric plant.

In Andrew F. Johnson, the instructor-in-chief, the school has a man unusually equipped to teach. Better still, his enthusiasm and unselfish devotion to the school for the school's sake, and his kindliness of mind and manner, have made him just an ideal executive.

There seems to be something about the school—an atmosphere—that leads to unselfish devotion to its aims. Professor Johnson's predecessor, John Gribbon, was such a lover of the work and the institution, that when he passed away, it was found he had remembered the school most gratefully and

lovingly in his will. One doesn't note instances like this among salaried officials very often, in any direction.

The Mechanics Institute

The building in which the school is housed is an imposing pile at 20 West Forty-fourth street, a few doors from the Fifth avenue. Our illustration gives the right impression of it. Here is an institution 126 years old, organized November 17 at Walter Heger's tavern in King (now Pine) street, near Broadway. Twenty-five persons formed the "General Committee of Mechanics," composed of delegates from the several trades.

Its growth has been like the city's growth, steady and great. Today it is a finely endowed institution, in a home specially built for its purposes, and performing a wonderful work for mechanics without cost, absolutely. It has an alumni association, issues a school magazine, gives prizes and scholarships, and has a free circulating library of about 100,000 volumes of books of reference.

Its courses are open to our own young men, of course, as their school is a part of the Institute, and those so disposed may perfect themselves under the ablest masters in machine details, drafting in connection with electrical industries, patent office drafting, drafting of gears and cams, free hand drawing from antique, and draped and nude life, decorative design, workshop and applied mathematics—but why proceed, when it is all told in the one word thorough.

If there is any foreign school under the auspices of the vehicle industry, anywhere, that approaches such a curriculum, at absolutely no cost to the pupil, we have yet to read about it.

How strange it is that this information is not more generally in hand to those whose business as editors it ought to be, to not only learn, mark and digest such facts, but to tell about them.

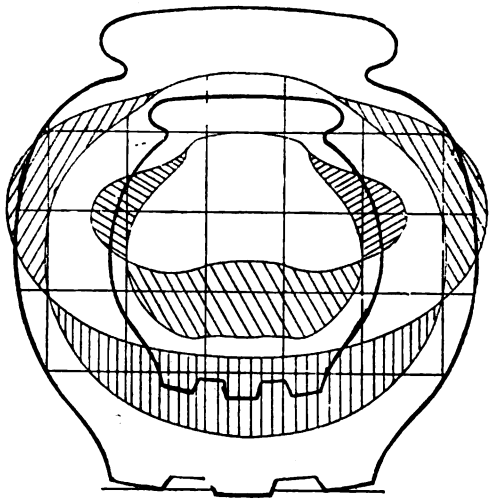
The technical school is the glory of our trade, the pride of our association, and the peer of any school in the whole world trying to render such a service to the deserving vehicle mechanic.

WHAT IS A PNEUMATIC TIRE

Large tires run easier, are cooler, cause less vibration and last much longer than small tires when the loads and the pressure are the same. That larger wheel diameter is of importance may be shown by comparing the smallest size with the largest. The smallest is 28 inches in diameter, making 720 revolutions per mile, and the largest 36 inches, making 560 revolution per mile. The cubic contents of the tube of air under pressure would be about 430 and 580 cubic inches respectively. The area of contact with the road would be the same for an equal pressure, 80 pounds per square inch and a load of 896 pounds. It will be seen, therefore, that with the same work to do, i. e., carry 896 pounds, the larger wheel can run easier, keep cooler and last much longer than the small one without any increase in the cross section diameter of the cover.

Every inch of the circumference of the smaller wheel would come into contact with the ground 2,880,000 times in a life of 4,000 miles, while the larger wheel would have to travel 5,143 miles to equal it. In addition, the cubic contents of the air tube of the larger wheel are 35 per cent. more than the small one; the area of the inside of the cover, under pressure, of the large wheel is about 32.5 per cent. more than the small one. It would appear that the small-sized wheel, while carrying the same load in a cover of the same diameter and at the same pressure is heavily handicapped against the larger wheel. This is an opinion of G. N., in Motor (Eng.)

In whatever manner the temperature of the air in the tube is increased it is due to the running of the car. For the sake of argument, the pressure increased from 80 pounds to 81 pounds per square inch may be conceded. As the area of the inner side of the cover is about 680 inches for the small wheel, this increase of pressure is equal on all square inches, and the pressure has to be raised by 680 pounds. Assume, by some means, the total pressure is raised in a run of 100 miles, 72,000 revolutions of the wheel, this gives a rise in pressure over the whole of one pound each 105 revolutions. This is the average; as the pressure increases the rate of increase falls. To raise the pressure equally on the 900 (more or less) square inches



of the large tire would necessitate a journey of 168¾ miles, or 94,500 revolutions of the wheel.

There is another handicap on the smaller wheel, and that is the small tire cover is deformed to a greater degree than the large one to obtain the same bearing, 11.2 square inches, about 35 per cent. more; therefore the ratio, one pound to each 105 revolutions, will not be sufficient for the large wheel with its smaller deformation; the large wheel may conceivably have to run 200 miles or more before the pressure per quare inch is raised to 81 pounds. Certainly the advantages are all with the larger sized wheels.

GOBY MOTOR NOT LUBRICATED WITH STANDARD OIL WEALTH

Standard Oil entered the automobile industry on Saturday; on Sunday, it turned around and walked right out again.

The basis for the story is that the Rockefeller Motor Co., which was incorporated under the laws of Ohio, with an authorized capital of $10,000, has or is about to take over the Goby Engine Co., and, it is intimated, may take over or in some way be linked with two automobile enterprises, one of which, apparently, will be a cyclecar company.

Immediately these reports were spread broadcast, denials arose in Cleveland, where, it is stated, that instead of representing John D. Rockefeller or other Standard Oil interests, the four lawyers were only junior partners in a law firm which has offices in the Rockefeller Building. The first incorporator was Thomas J. Fay, one-time president of the Society of Automobile Engineers, who, during recent months, has been engaged in developing the Goby piston valve engine in Cleveland.

BROKER SELLING MOTOR WAGON ASSETS

A. C. Applebaum, a Detroit broker, is disposing of the assets of the bankrupt Motor Wagon Co., of Detroit, at private sale. When the property was put on the block by the receiver, the Union Trust Co., the best bid received was $3,250, but as the material on hand was appraised at $40,000, the court promptly rejected it. The receiver then disposed of $4,000 worth of the stock and, with the consent of the court, entered into an arrangement with Applebaum, whereby the latter agrees to dispose of the remaining assets on a commission basis.

WHY CYCLECAR HOLDS THE ROAD

It has often been stated that the cycle car is dangerous to drive at speed, it being alleged that its narrow track, rarely exceeding 3 ft. 9 in., is insufficient to give it stability. As a matter of fact the stability of any vehicle does not depend entirely upon the track, but upon other considerations, such as the general build of the vehicle and the arrangement of the springing.

The forces that tend to overturn a machine when turning a corner may be considered. The tendency of all matter in motion is to move in a straight line, and any alteration in the direction of travel introduces forces which oppose that alteration. These forces act on what is known as the center of gravity of the body, which is a point, located within the body, at which the entire weight may be assumed to be concentrated, for the purposes of calculation. As a vehicle turns a corner a force is set up known as centrifugal force, which tends to push the machine out from the circle in which it is turning. The higher the speed of the machine the greater this force.

This force acts on the center of gravity of the machine, and tends to push the entire vehicle sideways. There is another force constantly acting on the center of gravity, and that is the total weight of the machine and passengers. These two forces, at right angles to each other, act upon the machine when turning a corner, and their effect is the same as that of a single force, known as the resultant, which acts at an angle to the roadway.

These forces are represented by straight lines in Fig. 1. It all depends on the point at which the resultant strikes the ground as to whether the machine will overturn or not. It must be borne in mind that the direction depends on the weight of the machine and the magnitude of the centrifugal force, which latter depends on the speed of the vehicle, the sharpness of the corner, and particularly the weight of the machine. If the line strikes the ground between the points of contact of the rear wheels, the machine will round the corner freely and easily. If the line of action of the resultant strikes the road at the point of contact of the outside wheel the machine will skid sideways, but if it strikes outside that point the vehicle will overturn.

It is obvious from the foregoing explanation that the higher the position of the center of gravity the easier the vehicle will overturn.

Fig. 2 shows the usual arrangement of the frame and axles on a cyclecar and also on a car, where it will be seen that the center of gravity of the cyclecar is much lower than on a large car. In the cyclecar the frame is practically in line with the axles, and the passengers sit a short distance above the frame, while in a car the frame is higher, and the passengers sit more above the frame. It is admitted that the weight of the car is much greater than that of the cyclecar, but it must be remembered that the centrifugal force also depends on the weight, so the direction of the resultant will not vary. Thus for the same track the cyclecar is many times safer than a car, and this is borne out in experience.

The track on a car rarely exceeds 4 ft. 8 in., while that on a cyclecar is generally less than 3 ft. 9 in.; that is a difference of 11 in. or 5½ in. on either side of the center of gravity. Fig. 3 shows that for the same direction of the resultant or overturning force, while the car will skid sideways the cyclecar will be turning the corner without slipping off the correct line Thus the cyclecar is more stable and safer than a car, taking average designs.

Of course, the stability depends on the design of the vehicle, and if the track is unusually narrow and the weight set high the machine will more easily overturn, be it car or cyclecar; but, comparing the design of cyclecars and cars, the weight is lower and more between the wheels on a cyclecar than on a car.

In a three-wheeler the tendency to overturn is of greater magnitude. In the four-wheeler the lines joining the points of contact of the wheels form a rectangle, and the line of action of the overturning force has to fall outside the rectangle to cause an upset. In a three-wheeler the lines form a triangle, and thus the resultant will fall outside sooner. The three-wheelers at present upon the market are built extremely low, and therefore their overturning tendency is small. It is an

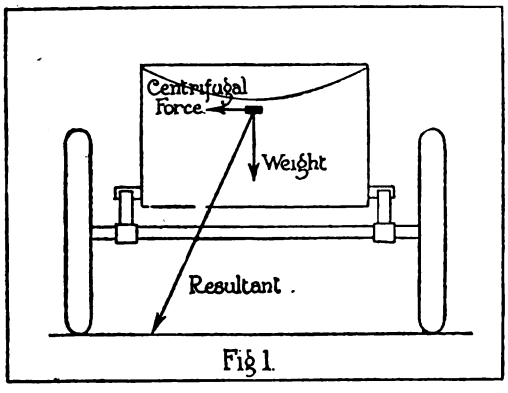


Fig 1.

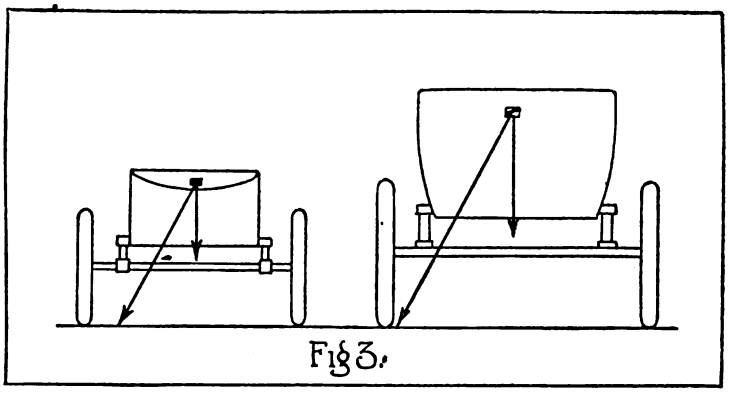


Fig 3.

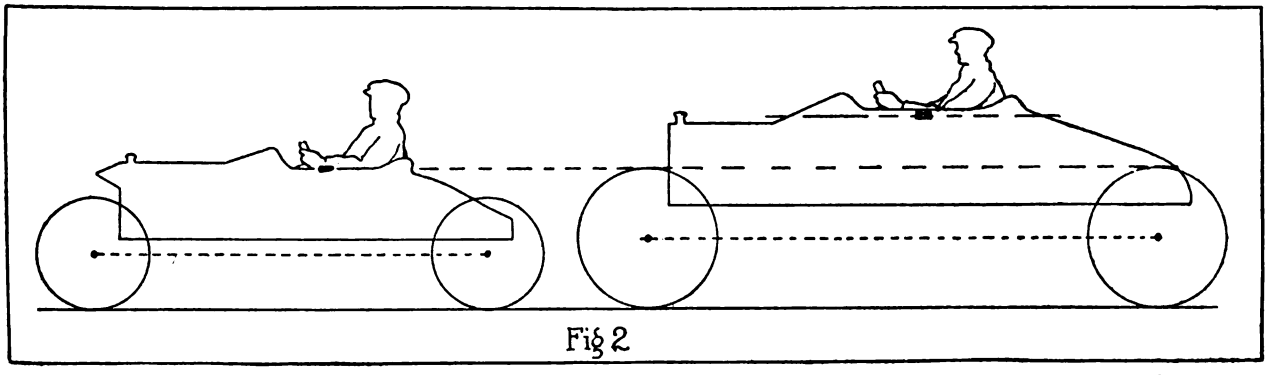


Fig 2

Fig. 1 shows the two forces acting on the center of gravity and their resultant. Fig. 2 shows the difference of height of the center of gravity of a cyclecar and a car. Fig. 3 demonstrates clearly the stability of the cyclecar.

interesting fact that the longer the wheel base of a three-wheeler, and the nearer to the front wheels the weight, the safer is the machine and the greater its stability.

As a car is admitted to be safer and steadier on the road than a motor cycle, a sidecar machine, or a horse-drawn vehicle, and as we have proved that a cyclecar is safer than a car, we are justified in our claim that the cyclecar is the safest vehicle upon the road, in spite of its small size and weight.—The Cyclecar.

HOW THE WESTINGHOUSE SHOCK PREVENTER WORKS

As is now pretty well known, George Westinghouse has for some years made a close study of this subject.

Shock prevention is only a question of sufficient resiliency in the spring suspension and the elimination of periodic vibrations and excessive rebound.

Mr. Westinghouse therefore directed his efforts, not in the line of hampering the normal spring action, but of augmenting it. To this end he interposes between one end of each of the four steel springs and the frame of the car a telescoping chamber charged with compressed air. One member of this telescoping chamber is attached to the frame of the car, and the other member is connected to one end of the ordinary steel spring.

This telescoping chamber of air spring has a possible movement of six inches, and since the axle of the car is attached at approximately the middle of the steel spring there is a possible relative motion of three inches between the axle and the body of the car without taking the flexure of the steel spring into consideration at all. The telescoping chamber also contains a quantity of oil for lubricating purposes and for adjusting the volume of the compressed air by which means the characteristic of the air spring may be varied at will. Naturally the mechanical details of the construction have been carefully worked out to prevent leakage of air and oil, but the exact nature of these details is not pertinent to the present discussion.

The steel springs and the air springs have widely different periods of oscillation, and on this account no periodic vibrations can be set up in the system. The only really scientific and effective method of damping vibrations in a spring system is to have the system composed of two elements with different natural periods of oscillation. The use of friction devices for damping vibrations in a spring system is illogical for the reason that in the endeavor to prevent the spring from doing what it ought not to do they hinder its doing what it ought to do.

NO UNITY OF DESIGN

Mr. C. E. Duryea always writes entertainingly, and says something. He has ideas. As he is a pioneer in automobiles, he has a large fund of experience to draw upon. He says the modern automobile lacks unity of design. This condition has been brought about by so many additional parts having to be added more or less on the spur of the moment, such as starting units, battery charging outfits, electric gearshifts and other devices. It is seldom that one is seen which has been developed as a unit. Ford, for example, furnishes a magneto that comes within this classification. The other makers attach the magneto, require extra bearings, extra gears, extra supports, and do not obtain the high-speed sudden break of the magnetic flow that Ford gets. On this account Ford should be able to give much easier starting and much better results, and doubtless could if his magneto were fully perfected.

The design of the motor vehicle has largely been influenced by the space at hand. The natural and original tendency was to put the motor as near to the work as possible, namely, at the rear. You will think of many of the early cars like the Pierce Motorette which did this, but larger motors and larger gearsets required more room and gradually forced the motor farther away from the rear axle until it is now at the extreme end of the structure, which unquestionably requires heavier framing, greater weight and higher cost than if it could be placed at the rear where it belongs. When you have thought of this a little you will see why we are trying to get the entire power plant into the simple possible form and at the rear where it should be.

We have not attempted to accomplish the starting of our small engines by power, but there is no reason why a magneto in the flywheel cannot spark, light and start, and it would certainly make a very simple arrangement.

Whether the electric or pneumatic gearshift will come into use or not is a question. You know the fate of the Sturtevant Mill Co.'s centrifugal gearshift which was shown some years ago at the Boston shows. This took care of the engine perfectly, but the maker could not find any one to put it on the market.

WATERPROOF GLUE

Ordinary glue may be rendered insoluble by the addition of tannic acid, dissolved in a small quantity of soft water. The amount can best be determined by experiment. To give a fixed quantity would be misleading because certain glues do not respond to the astringent action of the acid as well as others.

In order to render glue insoluble in water—even hot water—it is only necessary when dissolving the glue for use to add a little potassium bichromate to the water, and to expose the glued part to light. The proportion of potassium bichromate will vary with circumstances; but for most purposes about one-fiftieth of the amount of glue used will suffice. In other words, glue containing potassimu bichromate, when exposed to the light, becomes insoluble. You can buy the bichromate of any good chemist, or preferably from a dealer in photo-engravers' supplies.

For another method of making waterproof glue soak ordinary glue in cold water until it sotfens, and remove it before it has lost its primitive form—that is, before it runs into a mass—which is the test of the right degree of absorption of water. After this, dissolve it in linseed oil over a slow fire until it comes to the consistency of jelly. This glue can be used for joining any kind of material. In addition to strength and hardness, it has the advantage of resisting the action of water.

Glue that is both waterproof and fireproof can be made by mixing a handful of quicklime with four ounces of linseed oil: thoroughly leach the mixture. Boil until quite thick, and spread on tin plates. It will become very hard, but can be dissolved over a fire, or in a glue cooker like common glue. Of course, this is not glue at all but a kind of waterproof cement that is extremely tenacious.

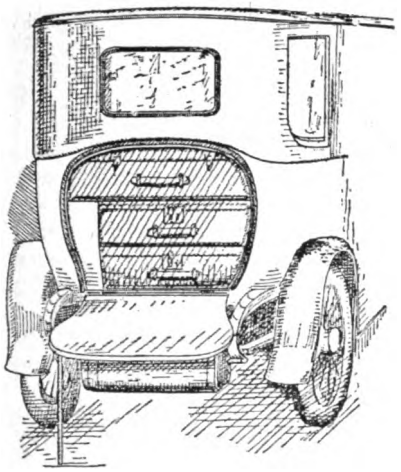
A very cheap waterproof glue is made by melting common glue with the smallest quantity of water possible. Add to this by degrees, linseed oil made "drying" by boiling it with litharge. While the oil is added, the ingredients must be well stirred, so as to mix them thoroughly.

Here is another way: Take of a very thick solution of glue, 100 parts; linseed oil varnish, 50 parts; and litharge, 10 parts. Boil these together for ten minutes, and use while hot. The additional ingredients have no effect whatever on the adhesive properties of the glue, which is rendered entirely waterproof.

There are a few other methods of treating glue to resist moisture, or the application of water, but there is no glue for wood which must be kept in contact with water that is better than that containing bichromate of potash. Be sure to allow it to harden thoroughly before exposing it to water.—Wood Craft.

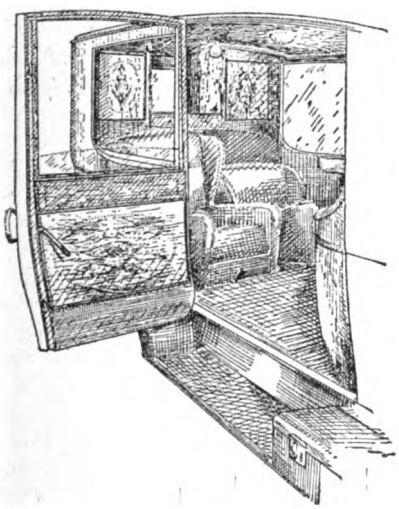
A WELL FINISHED INTERIOR

The sketches are from one of the latest of the productions of Van den Plas, of Belgium, on a Metallurgique chassis. The general arrangement is that of a comfortable enclosed car to seat four persons, with the whole of the requisites for a tour confined within the lines of the body work. The impression made by the general appearance is that of a well designed,



Cabinets at rear of Van den Plas body

compact touring carriage, without any ornate elaboration on the exterior. The interior, however, has been treated in an elaborate manner, and is fitted up with every requisite for comfortable traveling. The interior seating is so arranged that the chairs can be set at any angle, either upright or in a reclining position. These are comfortable, and are upholstered in antique leather. The cabinet fitted in front contains the usual fittings, and a conveniently placed wash-hand basin supplied from a tank under the roof in front. At the rear above the seats are two other large sized cabinets and two drawers, as well as a large recess immediately in front of the rear win-



A Van den Plas interior

dow. This space is available by reason of the arrangement for carrying the luggage. The sketch shows how this is arranged. The trunks can be lifted out without any trouble, and are of substantial dimensions. On the near side there is arranged a small wash-hand basin for the use of the driver, a special tank for the supply of water being fitted above. The boxes, when in position, are covered up by the door, and there is no grid or guard rods to be seen. The whole design has been carried out with that care in finish and detail which is characteristic of the firm. The new locks introduced by Van den Plas are fitted to the doors, and work with great precision and without noise.

ST. LOUIS AS A HOST

Ample arrangements have been perfected to royally receive and entertain the vehicle builders in St. Louis. The booklet issued is an alluring program. It has been arranged by the Implement, Vehicle and Hardware Association of the city. Mention of those in charge tells the whole story. They are Messrs. P. E. Ebrenz, L. A. Geserich, H. P. Hubbell, J. M. Hubach, P. R. McCoy, Russell E. Gardner, Jr., and G. B. Ogan.

On Tuesday evening, in conjunction with the C. B. N. A. reception, the local committee has co-operated to produce an "Arabian Nights' Reception and Entertainment and Dance," on the parlor floor of the Planters'. Eight to twelve are the hours, and admission tickets may be had from Secretary McLear.

This is the get together function to make all welcome and acquainted.

The ladies' local committee is composed of Mrs. P. E. Ebrenz, Mrs. Geo. B. Ogan, Mrs. W. H. Roninger, Mrs. C. R. Crawford, Mrs. J. D. Cathey, Mrs. Harry Hubbell, Mrs. Thompson Price, Mrs. E. C. Sullivan, Mrs. E. L. Roninger, Mrs. H. F. Cartwright, Miss Lulu Champ, Mrs. Geo. M. Hoffman. These ladies will serve all through the convention as a committee.

Wednesday there will be given a tea for the ladies at the Midland Valley Country Club, for which private cars will leave the hotel at 2:30 p. m., and returning leave the club at 5 p. m.

Thursday the ladies will have another treat. An automobile ride through the parks and beauty spots of the city is the objective. From 2:30 until 4 p. m. will be the schedule. In the evening a theatre party is on the program.

Friday will wind up the festivities with an "Inspection and Luncheon" at the Anheuser-Busch Brewing Co.'s plant. Automobiles will leave hotel at 2:30 and return at 4:30 p. m.

HINTS FOR TRIMMERS

Fixing Roll-up Straps—Do away with knobs on the hood by putting the top of a glove fastener in the roll-up strap, using the bottoms that tack on; or what are called cages that drive in. Should you use knobs and have to fit an envelope it means that you must use eyelets where the knobs are.

Making Round Straps—In making round straps, use sash cord for inside, and after sewing roll them well or pull them through an old punch. Hang up and let them get thoroughly dry before putting on the car.

Cutting Celluloid—In cutting your celluloid for back curtain it will save waste if you cut the sheet into eight equal pieces. As a rule the sheets are about 50 x 20 inches; and divided will give you 12½ x 10 for each piece, quite large enough for the ordinary hood.

Cleaning Hoods—To clean enamelled leather tops wash them with lukewarm water and castile soap. Apply the water with a sponge, then scrub with a stiff brush. Cleanse with clean water and dry well with a chamois leather.

Oiling Hoods—Wash off the same as cleaning a hood, then mix neatsfoot oil and vegetable black. Rub well in, let stand till next day, then clean off black and oil with clean rags. If the leather should be hard, before oiling, soak well with kerosene.

Blacking Hoods—Wash off clean. Touch up the bare parts with glossy black, and when dry coat all over with quick black as thin as possible, using a camel hair brush. When dry mix one-half Japan, one-half raw oil, and about a tablespoonful of turpentine. Apply a medium coat over the quick black.—Australian Coachbuilder.

During the past ten years, according to figures compiled by the New York Custom House, the United States treasury has been enriched to the extent of $10,123,427 by the importation of automobiles, which represents 45 per cent. duty on 8,774 cars; their value aggregated $22,507,615.

THE CYCLECAR EPIDEMIC

Definite news of the activity going on in Detroit in the cyclecar field has been hard to get, due to the fact that every company working on these little cars has been too busy perfecting its plans to have time to give anything out to the public. Probably the most significant point covering the situation is that the light car development has arrested the attention of men and firms of established reputation in the automobile industry and that they are taking a hand in the work.

Definite information has just come out concerning the future plans of the American Cyclecar Co., which was incorporated in Michigan early in the year and has since been working very quietly on experimental models. The first cars were designed and built under the supervision of the Herman Engineering Works and have been on the road for some time.

The two cars, which have been on the road for some time, are equipped with four-cylinder, water-cooled motors of 2.875-inch bore and 4-inch stroke. They are designed to carry two passengers side by side. These cars have 80-inch wheel bases and 44-inch treads. When equipped with the lights, a windshield, top and tools, the machines are to sell for $390.

Aside from the American Cyclecar Co. and the two concerns who have gone to the point of taking factory space, the Princess Cyclecar Co. seems to have perfected its plans about the farthest. A two-passenger model will be made the leader, although a four-passenger car and light delivery van will be built upon the same chassis.

The features of greatest interest about the Little Princess, as the car is called, are the air-cooled motor and the gearless differential. The motor design calls for block cylinders with the inlet and exhaust manifolds cast integrally. A bore of 2.5 inches and a stroke of 3.875 inches will give it a piston displacement of 92 cubic inches or about 1,500 cubic centimeters, which brings it outside of the English cyclecar definition of 1,100 cubic centimeters. The fan is incorporated in the flywheel. Details of the differential are being guarded, but it is stated that it will not contain the usual bevel and spur gear but will be incorporated in the wheel hub.

The gearset is a planetary type with two speeds forward and a reverse from which the drive is carried to the rear axle shafts by a shaft and bevel gears. The spring suspension includes semi-elliptic in front and a semi-transverse spring in the rear. Other specifications are: Tubular front axle, two sets of brakes, 28 x 3-inch tires on wire wheels, 44-inch tread and 86-inch wheel base. The weight is below 620 pounds. First deliveries will be made on February 1, 1914, at a list price of $375.

Probably the latest comer in the field is the concern which is being promoted by A. R. Thomas, under the name of The Detroit Cyclecar Co. The estimates call for a four-cylinder motor of 2.75-inch bore and 4-inch stroke. Again a displacement of approximately 95 cubic inches puts the car outside the definition and in common with all the other so-called cyclecars announced in Detroit it really belongs to the light-car class as it is known in Europe. Another feature which departs radically from the popular conception of the cyclecar is the use of wood wheels. Two body designs have been evolved, both for two passengers only. The one that is expected to be the most popular is along racing car lines, without a cowl and with bucket seats. This has full fenders and sells for $375. The other lists at $475, is of the protected type with very sweeping stream lines. A very original effect is produced by a radiator whose lines converge at a blunt point in the center in which the headlight is incorporated. The more orthodox features of the design are a two-speed and reverse gearset, shaft drive, 48-inch tread and 92-inch wheelbase. The weight is estimated at 700 pounds.

The American Voiturette Co. has leased the former Brush runabout plant. Everything is ready for installing the machinery. Shipments of axles have arrived and other parts are on the way which will be made up at once into agents' demonstrating cars.

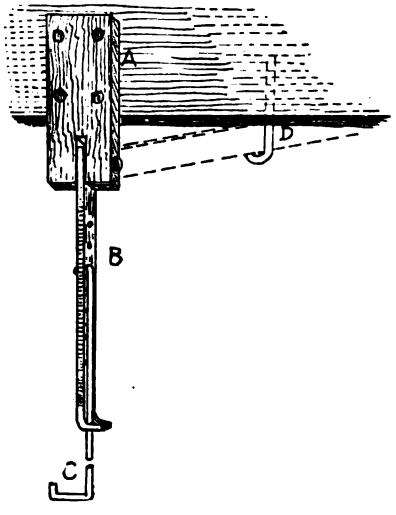
W. C. Little, who has severed his active connection with the Chevrolet Motor Co. to take control of the Sterling Motor Co., states that he is going to be among the first in this country to manufacture small motors for the cyclecar market. Mr. Little is not ready as yet to announce the details of the new product other than that it will be of the four-cylinder, water-cooled class. The Sterling plant at Flint is being removed to Detroit where its regular line will also be continued as well.

One of the first real American cyclecars, The Imp, having an air-cooled twin-cylinder engine, with friction discs and drive by V belts, has recently been produced by the McIntyre factory, of Auburn, Ind.

The engine, with its cylinders set at 50 degrees, is rated at 10-12 h.p., and is placed transversely across the frame, a torpedo-shaped gasoline tank being fitted above it. The drive is from an extra external flywheel, which has a smooth flat face, and acts as the driving friction disc, the driven disc, which is mounted on the ball bearing countershaft, being faced with a special material. Keyed to the extremities of the counter shaft are pulleys of large diameter, and V belts of great length transmit the drive to the rear wheels. There are no axles in the strict sense of the word, two long flat springs being used instead. The steering is controlled by steel cables, running over a bobbin, which is placed centrally, as the seats are arranged tandem fashion, the driver sitting in front. The machine is low built, the frame being underslung.

SHOP TIRE HOLDER

The device illustrated acts as a third hand. It is fitted directly over the anvil and may be swung entirely out of the way when not in use. The piece, A, is of wood and may be any size or length just so it is well above the smith's head and out of the way of things in general. This piece is fastened firmly to the ceiling beam. The piece, B, is from old flat tire.



It has holes bored as shown—one at the upper end by means of which it is bolted to the wood piece, A. Several ½-inch holes are then bored in piece to allow for adjustment to length when piece C is fitted. The lower end of piece B is bent at right angles at about one inch from the end and then a ½-inch hole bored in the bent part. Now take a rod 7/16 inch in diameter and bend a short hook on one end and a long square hook on the other end. This is then put into the piece B, and the tire holder is complete. The hook, D, is simply for holding the device when not in use.

W. W. Beeson has been appointed manager of the Studebaker branch in Atlanta. Tributary to the branches are the states of Georgia, Alabama, Florida and South Carolina.

Paint Shop

COVERING POWER OF PAINTS

In approaching the question of covering power, it is fair to say that the subject is a very difficult one. It is essential to define what is understood by "covering power," since the words have been used in a number of different senses. We find no less than four definitions or explanations of what is meant by "covering power" in more or less common use. We will remark on each of these in turn.

First—The words "covering power" may be used to express the power of a pigment to protect oil. In paints which dry with a gloss, the oil covers the pigment and practically what is exposed to the weather is a glossy layer of oil. In paints which dry more or less "flat," the pigment is practically more or less exposed to the weather, being held in position by an extremely thin layer of oil, and in reality is a valuable means of protecting the oil from decay. We do not think this use of the words "covering power" is very common, but for the sake of completeness we give this explanation—namely, that covering power may mean the protection or covering of the oil by the pigment. It is obvious that this protection is obtained by the proportions of oil and pigment. A large amount of oil and a small amount of pigment would produce a paint in which the oil would protect or cover the pigment. On the other hand, a large amount of pigment and a small amount of oil would produce a paint in which the pigment would protect or cover the oil. That paint is much the best for durability in which the pigment is used in such proportion as to protect or cover the oil.

Second—The words "covering power" are sometimes used to expose the amount of color on a surface; or, in other words, if a surface has plenty of color in it—in the case of color pigments, for example—the covering power is said to be good. If the surface is deficient in color, we say the covering power is poor. This definition or meaning of covering power may, perhaps, best be made clear by citing examples of paints, which would be regarded as having good or pure covering power in this sense. Thus, if a paint is proportioned so that the liquid and the pigment bear to each other the ratio of about 50 per cent. pigment and 50 per cent. liquid by weight, the paint will have good covering power, so far as the amount of color on the surface is converned. If, on the other hand, a paint is so proportioned that the amount of pigment and the amount of liquid are in the ratio of 10 parts pigment to 90 parts liquid, these paints would be deficient in covering power in the sense in which the words are used in this paragraph. It is plain to be seen why this should be so—namely, there is not enough pigment of the desired color to properly cover the surface. Although in the last case mentioned above there is enough pigment for the proper protection of the surface, yet the pigment is deficient in coloring material and consequently in the proper covering power. The deficiency in covering power, in the case in which the words are used in this paragraph, most commonly occurs in actual practice from the use of too large an amount of diluting material in the paint. We have seen paints in commercial use which have had such large amounts of volatile diluting liquids that when they were put on surfaces, and the volatile material had evaporated, the coats were so thin that fairly they could be said to be deficient in covering power, in not having enough pigment to fairly cover the surfaces. Such paints approximate to what may be called "stains." It is more rare in actual service that the pigment contains a deficiency of the desired coloring material, although this will give the same undesirable result in the finished paint.

Third—Another sense in which the words "covering power" are very commonly used is to express the amount of surface that a given weight of paint will cover. It is well known that Prussian blue is one of the "strongest" paints in service, having what fairly may be called enormous covering power in the sense in which the words are used in this paragraph. The various pigments differ very widely in their covering power in this sense, provided comparison is made by weight and it is not at all difficult to see why this should be so. All other things being equal, it is obvious that the same covering power will be obtained whatever the pigment, provided the same number of particles of the same size, and of the same power impending the passage of light, are on the same number of square inches of surface. If a square inch of surface has 100,000 particles of the same size of white lead or of Prussian blue or of yellow ochre or of any other pigment, and if each of these pigment has the same power of preventing or retarding the passage of light, it is obvious that the surface will be equally well covered by the use of each. But it is well known that each individual particle of each pigment has its own peculiar weight. This is in reality its specific gravity. Thus, for example, a single particle of white lead is about 6.4 times as heavy as the same volume of water, while yellow ochre is from 3¼ to 4 times the weight of the same bulk of water, and so on. It is obvious, therefore, since pigments differ so much in the weight of their particles of the same size, that it would be impossible to get the same number of particles of the same size on a square inch of surface out of the same weight of material. In the third sense, therefore, the covering power of paints bears close relation to their specific gravity, the lighter paints having the power of covering the greater amount of surface. Of course, it must be carefully noted here that the fourth and most important sense in which covering power is used may very greatly modify this statement. If all pigments had equal covering power in the fourth sense, it is unquestioned that those of the lightest specific gravity would cover the largest amount of surface. Unfortunately, many of the light pigments do not have good covering power in the fourth sense, and so, as said above, it is hardly possible to make the universal statement that those pigment which have the lightest specific gravity will cover the largest amount of surface for the same weight of pigment.

Fourth—The fourth sense in which the words "covering power" are used is an optical one, and has to do with the behavior of pigments toward light. This is really the most important sense in which the words are used, and when any new pigment is brought forward, it is the most important sense in which its properties are studied. If its optical covering power is defective or inferior, although the pigment is satisfactory in every other sense, it will never be regarded as a good pigment, and all mixtures of pigments and all new shades are in practice first subjected to the test of optical covering power before they can be regarded as satisfactory. We query whether master painters do not regard the optical covering power as the principal sense in which the words are used. In our observation and experience it is certainly the first question that is asked, and the first test that is made by master painters when any new paint is offered. It is also in this sense—namely, optical covering power—that we have put most of our study on pigments, and we find the problem very much more complicated and very much less easy of solution than we had supposed. The optical covering power of pigments may, perhaps,

best be defined as their power when spread on a transparent surface, as, for instance, a piece of glass, and this is one of the common methods of studying the optical covering power of pigments. Another method is to spread some of the pigment, properly mixed as a paint, over a dark surface or a light surface, and see how completely it prevents the light from going through the pigment to the dark or light surface underneath and then come back to the eye. If the pigment has good covering power, a single coat many times will cover a light or dark surface so completely that it will not be visible through the layer of paint. If it has poor covering power, not only will one coat not cover the light or dark surface underneath, but in some cases even many coats will not prevent the light passing down through to the light or dark surface underneath and coming back to the eye. In other words, the pigments of poor covering power will not hide a surface underneath a pigment, while a pigment of good covering power will, or what amounts to the same thing practically, a pigment of poor optical covering power spread on a glass will not prevent the light from passing through or prevent the observer from seeing some of it through the paint and glass, while a pigment of good optical covering power will prevent both.

Much study has apparently been put on the subject, as we find considerable on record in the books, but we are not aware of any place where the problem has been stated, and all the information brought together so as to give a tangible and lucid explanation of the matter.

We began our studies by assuming the following hypothesis—namely, if any two continuous square inches of transparent surface, as, for example, a piece of glass, are covered with the same number of particles of the same size, the light will be equally prevented from passing through the two, irrespective of the nature of the particles—that is to say, if one square inch of a piece of glass had 10,000 particles of white lead over it, and another square inch had the same number of particles of the same size of barytes, sulphate of lime, silica, whiting, or ground glass if you choose, spread over it, the two surfaces would be equally well covered. This is unquestionably true so far as mechanical covering is concerned, but to our chagrin, after spending a good deal of time in trying to reduce several to the same sized particles, we found that this hypothesis did not hold true, and that covering power was based on a still deeper relation than the breaking up of the light by the finely divided particles. The proposition as stated does fairly well hold true with dry pigments—that is to say, if dry pigments are put on a piece of glass, the layer in each case having the same thickness, and the pigments of approximately the same degree of fineness, the power to break up the light and prevent it passing through the glass to the eye is approximately the same, whatever the pigment, at least so far as our experiments have gone, and we have tried white lead, zinc white, talc, sulphate of lime, barytes, feldspar, silica, and powdered glass. We conducted our experiments with these dry pigments in two different ways. First, we took a very fine silk gauze, which approximately measured 0.004 inch in thickness, and stuck this to a piece of glass with some gum water. This gave us a mesh on a piece of glass, which mesh was rubbed full of the different kinds of pigments which we experimented with. We had no absolute means of determining the size of the particles in every case, but even ignoring this, we found that a piece of glass so arranged and held between the observer and the light would shut off any object on the opposite side or prevent the light passing through almost equally well, irrespective of the nature of the pigment. We did not find this to hold absolutely true, but very largely so—that is to say, the powdered glass sufficiently fine would shut off the light under these conditions almost equally as well as white lead. Another method of experimenting consisted in mixing up the various pigments with a very dilute solution of gum water and spreading them with a brush on glass. The water evaporated and the amount of gum left was extremely small, but still sufficient to hold the pigments on the surface. In this case, again, the covering power of the various pigments differed some, but not very greatly, and it was astonishing how completely powdered glass would shut off the light. Unfortunately, however, when we came to use oil as a medium to hold the pigments on the surface, which is the state of affairs in ordinary painting, as is well known, our theory broke down completely. With white lead a single good coat on glass would give a very fair cutting off of the light. With sulphate of lime, talc, whiting, or powdered glass, although we were careful in every case to have the same volume of pigment on the same amount of surface, the cutting off of the light was in many cases very slight, and in some cases, indeed, there was very little interference with the distinguishing of objects on the opposite side of the glass. We are quite well aware that this is common experience, and that these tests are made frequently by master painters and others, always, we believe, with the same result—namely, that certain pigments do not have covering power in the sense of preventing light from passing through a transparent surface coated with them when the pigments are mixed with oil.—Dr. C. B. Dudley.

PAINTING AND DECORATING TRADE VEHICLES

Lettering and decorations should always be in character and keeping with the business of the owner and the purpose for which the vehicle is to be used.

The more general adoption of brighter colors for vehicles used for commercial purposes has led the way to better decoration on the panels. Where gold leaf is to be used it is necessary that the painting should be especially good and that no colors should be used which are likely to crack or discolor the gold or the tint used for shading, and so spoil the whole. On cheaply got up work transfer letters are good enough to use, and in this case it is always best to see that the ground is solid, and to take care that the colors have not been prepared too "hot," for if they have, the gold on the transfer, being very thin, will only show up any imperfections the sooner, and even the little spent upon the painting be entirely thrown away. Where the builder knows that a proper pride in its good appearance will be taken by the owner, then greater care in the painting and decorating will amply repay the builder and the owner as well.

The preparation of the panel for decorating is an important matter, and the surface of the wood should be carefully finished. It is necessary to see that the grain of the timber is well filled up and rubbed smooth. Where good work, and especially in light colors, is expected, none of the heavy, dark colored varnishes should be used, as these discolor the ground and are more apt to crack than those of a paler color and more elastic body. The gilding and decorating should always be done on the top of a coat of clear varnish which has been flatted perfectly smooth, and this implies that care has been taken to get the undercoating well flatted, clean and smooth, for varnish should not be put on to be rubbed off again.

If care is taken with the undercoating, the decorations will come out, on the final coat of varnish being applied, at their best. A plan which gives very good results, where there is much color decoration and shading in the scheme of decoration, is, before the next to last coat of varnish is given, to fill in the ground of the decorations and the block shading of letters, leaving out all the gold work, and to varnish over that; this gives a very smooth surface for finishing, and enables the gilder and decorator to get up his work to the best advantage. It is often noticed that lettering is lumpy and raised at the edges, giving a very impoverished look to the finished work, especially on large panels. If the decorator edges his work with pale varnish about half an inch wide round each letter, this will flat nicely with the panel and finish off smooth. If there is not time for the decorator to come twice to the job,

a thin coat of varnish over the painted parts will enhance the work greatly. When transfers are used, these should be varnished over when dry with this, clear varnish; this develops the colors and designs, and enables the painter to finish his work in the best manner possible.

THE INFLUENCE OF MOISTURE ON THE SETTING OF LINSEED OIL

A good deal has been written and said about the influence of moisture on the setting of linseed oil, some authorities arguing that because paint takes longer to dry in wet weather than in fine, therefore dampness is unfavorable to the setting of the oil. This, of course, is no proof, for in wet weather there is less sunshine and the temperature is frequently lower. Now, both sunshine and warmth greatly accelerate the drying of oils, and this alone may account for the difference observed. Two glass plates were coated with raw linseed oil and placed one on the top of a beaker of water under a large glass bell jar, so that it was exposed to an atmosphere saturated with moisture. The second plate was placed in a large glass vessel containing fragments of calcium chloride—a chemical which readily absorbs moisture, and therefore served to keep the air in the vessel perfectly dry. The plates were thus kept at precisely the same temperature and subjected to just the same amount of illumination, the only difference lying in the fact that one plate was exposed to a moist air and the other to a dry one. It was made clear that moisture very materially assists the initial stages of oxidation of the ray oil. When, however, the maximum increase in weight has been attained, which, by the way, is identical in amount in the two cases, the oil exposed to the dry air loses in weight more rapidly than that in the moist air. It does not necessarily follow, however, that the former is decomposing more rapidly than the latter, for the following reason: When the oil decomposes, water is evolved, which would rapidly be taken up by the dry atmosphere, whereas in the moist atmosphere it could hardly escape so rapidly, and thus make the oil appear to be heavier than it is, and hence seem not to disintegrate so rapidly as it really does. Similar experiments with boiled oil did not yield any decided result. No doubt the presence or absence of a drier has a great deal to do with the behavior of boiled oil.

This raises a very interesting question, namely—does raw linseed oil absorb water during setting? In order to answer this question an apparatus was devised whereby moist air containing a known quantity of moisture was placed over raw linseed oil, and then analysed again to determine the amount of moisture it still contained. At first the linseed oil absorbed very considerable quantities of moisture, but after three days it began to evolve water. Thus brought about a curious anomaly, that the so-called "drying" of raw linseed oil is in its initial stage a moistening.

This suffices to explain the retardation observed in the setting of the raw oil in the dried atmosphere of the previous experiment. That the oil did not eventually set is probably attributable to the presence of those traces of water normally present in it, which assisted a portion of the oil to oxidize to that condition at which it begins to evolve water. This evolved water would then assist neighboring positions of the oil to oxidize, and when once an appreciable amount of water had been produced in this way within the oil, further oxidation would proceed readily. In the case of boiled oil the initial stages of oxidation are probably already completed during the process of boiling, so that the addition of water is not essential.

NEW VARNISH TROUBLES

A thing to be remembered is that now so much tar is used in road surfacing, there must be a large proportion of it in the mud which is thrown upon the car. It follows then, that if this mud is allowed to dry on, it is much more difficult to remove, as the tar has a binding effect and water will not so readily soften it. Not only that, but the tar has an effect on the varnish, and, if a place is examined with a lens where such a spot has dried, it will be found that the surface is roughened, which gives the appearance of a spot; even water, if allowed to dry on, causes a spot which is caused by the deposition of impurities of natural salts contained in the water, which, on evaporation, leaves them behind. In some cases water contains iron, in others sulphur, and so on, according to locality and its source of supply, but limey water spots badly; no matter where it is obtained, so long as it is unfiltered, it behooves the car washer to be more than ordinarily careful in wiping off.

Sometimes, owing to an excess of oil used in the engine in conjunction with a following wind, the back part of the car becomes covered with smoky grease, in which case, it cannot be removed with water, and it will be better to place it in the hands of someone practiced in the handling of varnish, but if not a very bad case, take a wad of cotton wool and a little sour beer and lightly rub off the grease, then take a dry piece of wool and remove beer, and, by successive rubbings with the dry wool, bring it up to its original condition, but it is better to place it in experienced hands.

A CONSIDERATION OF COLOR

The appreciation of color, a writer in The Decorator says, is only one of the things that sank to a low ebb in Victorian days, and the carriages of that period, with the exception of the few which blazed with the flaring mustard color known as carriage yellow, might all have done duty as funeral coaches. Black and its variations, invisible green and midnight blue, were the almost invariable colors.

When we think of some of the colors which we see on the road nowadays it is hard to believe that such a change could have taken place within twenty years. It soon became evident that the high speed of the motor car produced on dusty and muddy roads an amount of dust cloud and mud splash which the horse carriage had never approached. When this dust or mud was deposited on black paint the smartest vehicle soon looked shabby because of the contrast. So the first step from black toward color was—strange though it seems—mud color. It was called silver grey, French grey, iron grey, but the object of it was to match the color of the road, and varying hues were adopted in different districts. Little by little more color crept into these greys, until one or two courageous spirits, ladies doubtless, adopted definite colors. Makers painted show cars in colors that would attract attention and single them out from the hundreds of others. It would be hard to find a color that would look really bizarre on the road. Several colors have been seen which are not exactly prepossessing, but much depends on surroundings.

Of all these modern colors on cars perhaps the most novel and most beautiful is mauve. There are several shades of it, all fairly good for hiding dust, and harmonizing well with nickel mountings. Brass mountings, contrary to what might be expected, do not look so well with mauve—gun metal would be much better. Khaki is also popular in many variations, some of them giving a very colorful rendering of the original dirt color. Green, of course, in great variety, blue, from sky blue to blue black, reds, browns, yellows—but why extend the catalogue?

Vertical stripes of alternating color are frequently seen, but even where the colors are harmonious the effect is not always happy. The lines of motor car bodies are seldom as suave and harmonious as they might be, suggesting too often a conglomeration of heterogeneous items, and these vertical stripes only emphasize this unfortunate state of affairs. The stripes are always parallel, and when they contrast with converging curves the result is not happy.

PRACTICAL TESTS FOR VARNISHES

Although no absolutely reliable tests can be applied to varnishes to determine their durability, yet there are certain points about them which will assist in that direction.

The first is color, and it is always useful to have very small bottles at hand so as to pour into them a little of the varnishes under examination, again having a standard in the several grades.

The depth of color will not tell much, because that will depend upon the grade, and although it would be a serious defect in a varnish to be applied to white work it would not be of much moment in some other cases. But there should always be an absence of turbidity or muddiness. If the varnish is more or less dark it should yet be clear.

There are two practical tests which may be easily applied, and both of them will give an indication of the presence of rosin. It is added principally for the purpose of cheapness and partly to lower the degree of heat necessary in melting the gum resins, which are the chief ingredients of most varnishes.

Place a sponge saturated with water on the surface of a coat of varnish and leave it on over night. If there is much rosin present the varnish will be found to be white, and probably more or less wrinkled. If the varnish is a good one, however, there will either be no white mark at all, or if there is one it will regain its color when dry.

A pad made of several thicknesses of felt saturated with water is better than the sponge, as it will touch a larger surface, and a light weight may be placed upon it to hold it in contact with the surface.

The second test is to scrape the dry surface of a coat of varnish with a sharp penknife. If the varnish is of high grade quality the ribbon scraped off will be tough and sharp at its edges; if much rosin is present the edges of scraped portion will be ragged and the film show distinct signs of being brittle. This test is a good one also for linseed oil.

The smell of varnish gives some information as to its quality, while the time taken to harden the degree of flowing and working under the brush all yield useful information.

It may be added that it is the opinion of Dr. A. P. Laurie, based upon the experiments he has conducted with his instrument, that the best oil varnishes do not attain their maximum hardness until twelve months after they have been applied.

COLORS REFLECTING HEAT AND LIGHT

The grays and yellows and their intermediate colors reflect the light and heat better than dark colors, and consequently if brought up right fade less. The dark colors invariably absorb more heat than light colors. They also appear to lower the height of the vehicle to which they are applied.

The browns, and especially the natural browns from which many of the latter day browns are compounded, are earthy pigment, and are strong and durable. That they are mixed and intermixed with other colors in order to produce the wide variety of brilliant browns so much in evidence upon the automobile tends in a measure to weaken their vitality.

The lakes, of which there are many examples in use upon automobiles, are in great part derived from coal-tar products. While perhaps not to be classed as strictly permanent when used apart from a strong supporting base, the painter need not hesitate to choose any individual of this group of pigments in selecting a color of brilliancy for the car.

All the lakes, including No. 40 carmine, require very strong and perfect supporting grounds.

PURIFYING SHELLAC VARNISH

Shellac varnish used in paint shops has a tendency to hold in suspension impurities that leave dirty streaks on patterns when the liquid is applied. The liquid can be easily purified by the addition of a few crystals of oxalic acid. The shellac should be stirred, to aid in a thorough mixing, then allowed to settle for several hours. Care should be taken not to use too much acid.

HALOWAX

This is synthetic oils and waxes. The name is given by the Condensite Co., wihch makes them at Glen Ridge, N. J. The product is a chlorine substitution product. Some of its properties are most interesting. They have no action on metals. Gums, resins, waxes, gutta percha and rubber, both raw and vulcanized, dissolve in the molten halowax and halowax oil, thereby making possible a large number of compositions of widely varying properties and uses.

They are a slow drying solvent for baking varnish and japanning compositions.

For wood filling and finishing and for a floor wax, the amorphous and flexible waxes No. 1003 and No. 1004 are best. As the waxes have an exceptional capacity for penetrating the fibres of wood, especially the No. 1003, they make excellent fillers, and require none of the laborious methods in their application that are usually employed. By the use of solvents they can be brushed on, and after the solvent has evaporated, will leave the wood not only filled, but less inflammable.

All the halowax products offer possibilities in the rubber industry. Vulcanized rubber can be reclaimed by dissolving it with halowax oil No. 1000 and while in a liquid state mechanically separating the fabric, inert fillers, etc., leaving the rubber and its contents of sulphur. The oil can be removed by the vacuum process.

There are many other uses named. We have an idea they could be made valuable for articles in the vehicle building industry in ways not yet tried out.

BRONZING LIQUID

Banana liquid or banana oil has no connection with extract of bananas, but the odor of it, caused by the solvent used, which is the synthetic or substitute essence of banana produced by the treatment of fusel oil with acetic acid, through which amylacetate is produced.

The basis of a good banana bronzing liquid is gun cotton or soluble cotton and camphor dissolved with amylacetate. Some of it is made from celluloid chips, which have the same origin.

On account of the high price of amylacetate, a proportion of benzine is used in its adulteration, as amylacetate will stand up to 20 per cent. of benzine in its mixture without separating.

AMERICAN CARS IN ENGLAND

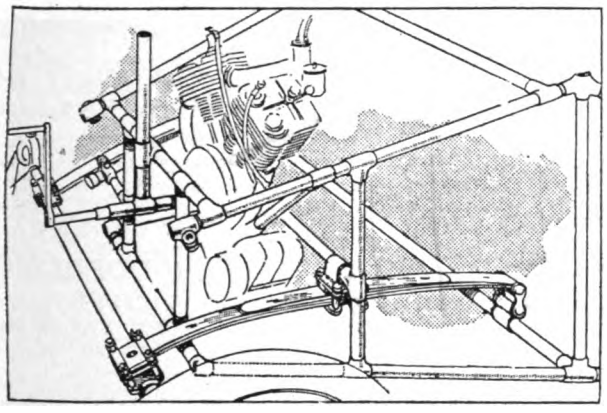
In the automobile trade conditions were never more healthy in England than in 1912. The circle of possible purchasers of motor cars is an ever widening one, largely because of the entry of the low-priced American cars into the market. Future prospects for medium-sized cars are also good.

One low-priced American car has so far conformed to the British preference for British manufacture as to make the bodies in Manchester, and the minimum estimate for the demand for this car in the coming season is 5,000, while a more liberal view puts it at 7,000. At the end of last season this company distributed among its agents in excess commissions and rebates no less than $195,000. Several other American companies are also preparing for increased trade in the coming season. One feature of the trade is that people here have come to regard the word American in connection with motor cars as synonymous with low-priced and low-powered. There are, however, at least two makes of medium-priced American cars which have found considerable favor with British buyers.

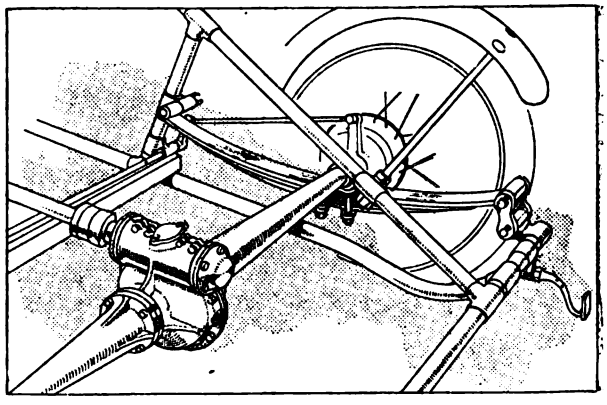
SHAFT-DRIVEN CYCLECAR, WITH NOVEL FEATURES

An interesting cyclecar has been built in London. The frame, which is tubular throughout, is underslung, both in front and at the back, giving a very low position. The semi-elliptical springs in front are at one end mounted rigidly to the front axle, the other extremity being shackled to the frame, while the center of each is attached to a bracket which swivels on a tubular support of the frame. Each of the rear springs, which are also semi-elliptical, is attached to the frame at the forward end and shackled at the rear. Another feature is that the outline of the scuttle and body is built up of tubes along with the frame to obtain rigidity without increasing weight.

The engine is an 8 h.p. air-cooled. The magneto is a Bosch, and is placed on the near side of the engine. Directly behind the engine is placed a leather-to-metal cone clutch, which is operated by a pedal placed on the left of the driver. The necessary pressure between the clutch faces is supplied by three small spiral springs, which can be readily adjusted, and they are so arranged that no thrust is put on the crank shaft. A



short shaft transmits the power to a small two-speed gear box, behind which is placed an external contracting brake. A universal joint of large proportions is fitted at the rear of the latter, and a long shaft conveys the power to the live axle, which is driven by an overhead worm, a differential being also provided. The front axle is tubular, and slightly curved in order to splay the wheels, while the steering, which is controlled by a large-sized steering wheel, is direct. The track is 4 ft., and the wheelbase is 7 ft. 6 in. The wings, both fore and aft, are fitted to the frame in sockets, so that it is an easy matter to remove them, and the same type of sockets is used to hold the lamp brackets. Ample room is allowed for



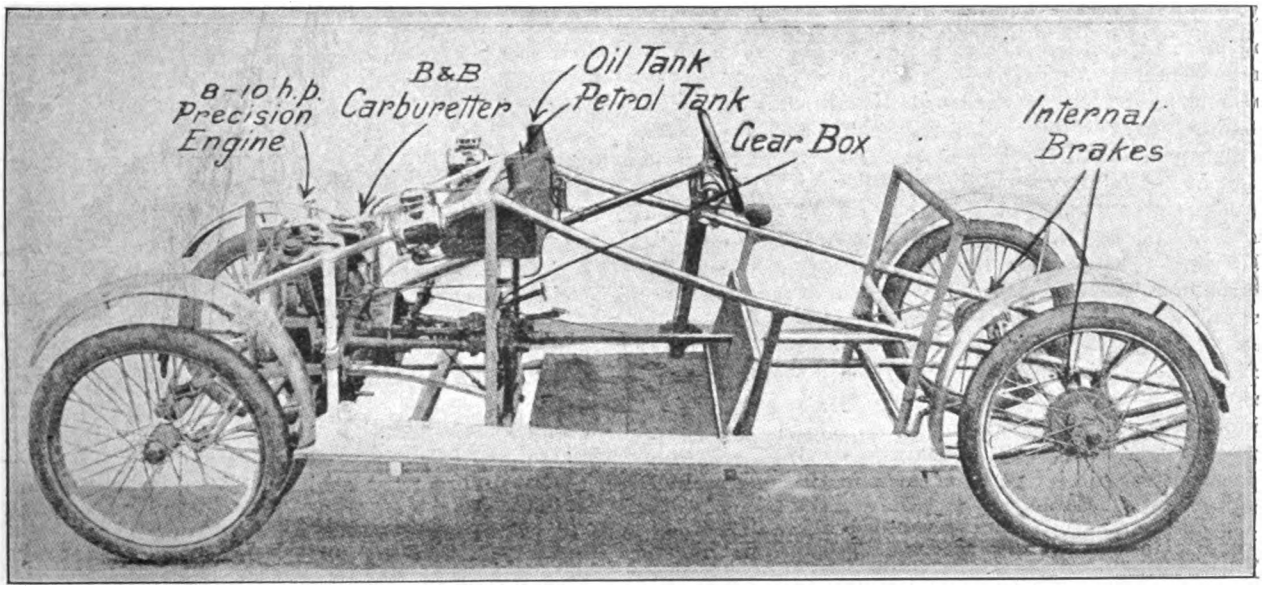
two persons, while a deep scuttle, inside which are fitted the gasoline and oil tank, will be provided.

FINAL DRIVE SYSTEMS

In all discussion about worm and bevel drives a question must arise in the minds of a few who have ridden in a certain form of chain-driven car. The type of chain is the broad-web chain, as used in the modern car's cam shaft system. This chain, when enclosed, is equally as quiet as most bevels, and a good deal more so than many, and it will wear as long as the car itself.

Thus we have all the advantages of chain drive (and they are many) and its only fault eradicated. The cost of such a drive is more than that of a bevel or worm, but it seems to have many advantages over these systems. Of course, every one scoffs at chains nowadays, but in a few years we may find a reversion to the chain in high-priced cars of some power.

The physical assets of the Grand Rapids Motor Truck Co. were sold at receiver's sale by the Grand Rapids Trust Co., September 23, to Frank T. Hulswit at $17,050, the purchaser assuming the mortgage on the real estate. The accounts and bills receivable amounting to about $7.000 will be handled by the receiver.



The very ingenious tubular framework is an interesting feature of the cyclecar built in England The sketches and photograhps give a good idea of the machine

MAKING TIRE HISTORY

The Firestone people have long been known as history makers in the rubber tire industry.

This year with the Firestone pneumatics they have been winning race after race where tire endurance meant history and centering the attention of the rubber using world on Firestone.

And all this achievement will surprise none of us in the carriage making and carriage selling fields. We know the Firestone people, and have known them and the quality of their product for many years. Before the automobile had

C. H. SORRICK

Manager Carriage Tire Department of the big Firestone plant, who will be in charge of that company's exhibit at the C. B. N. A. convention in St. Louis.

"arrived" at all, Mr. H. S. Firestone, president of the Firestone Company, was in the rubber carriage tire business, and from the very start he took an uncompromising stand for a product of superior quality.

There was a time when this stand for quality in the face of strong price competition meant pretty hard sledding for a small, new concern. But there was a "know how" to the Firestone making, a restless desire for betterments of design and fastenings, backed by an inventive turn and a gift for business management, all of which made the Firestone influence quickly felt in the industry.

These things account for the Firestone record of "never an off season" in its long successful history. And it is on this foundation that the company found it easy to grow to its present proud position of the world's largest exclusive manufacturers of tires and rims. It is the Firestone organization that users of carriage tires can thank for some of the most important improvements during the past twenty years. Among the Firestone achievements, for instance, are the following:

The side-wire tire, unequalled for service.

The present standard design of channels, simplifying the channel question for the whole industry. The present successful method of curing tires in continuous lengths without joints or weak places, enabling dealers to buy their tires on reels instead of in short lengths only and saving the waste of scrap ends. The present method of brazing wires, by means of which every dealer can own and operate a tire applying outfit of his own and make the repair profit himself. These things have counted big in the carriage tire industry. They are the marks of a big, progressive firm that makes good with the dealer.

When interviewed recently for The Hub, Mr. C. H. Sorrick, say:

"The prime reason for the big Firestone success is that our organization is a tire organization from first to last. We don't get side-tracked. We stick to tires and the perfection of tires and rims.

"As a result we are producing a rubber that gives the greatest mileage per dollar of cost with the right degree of resiliency for complete comfort in riding, and most protection to the vehicle."

The Firestone Company makes a variety of types of tires, the Side Wire, the Cushion, the Internal Wire—all of which, with other things of big interest to the trade, will be on exhibition at the St. Louis convention.

THE EFFORT TO START A TECHNICAL SCHOOL IN PHILADELPHIA

Plans for the establishment of a technical school for carriage makers' apprentices were outlined to more than 40 members of the Philadelphia Carriage Makers' Association, at its first fall meeting, at the Hotel Hanover.

The school is to be held at the Central Y. M. C. A. and the first session was opened September 29. It will be conducted by instructors, who have spent the summer studying the carriage making business abroad. The course will last for one year. The Philadelphia school is the second to be established in this country.

SCHACHT REORGANIZATION HOPELESS

The Schacht Motor Car Co., of Cincinnati, which became financially enmeshed in April last, will soon become but a memory if the report of the receiver is confirmed by the court.

The receiver, John F. Dietz, a Cincinnati desk manufacturer, who was also a Schacht director, declares that "there is no possibility of a reorganization or continuance of the business at a profit." He, therefore, recommends that all necessary help be discharged and the property be advertised for sale.

GET IN WHILE THERE IS TIME

The Technical School for Carriage Draftsmen and Mechanics opened on September 22 with a full attendance in the evening classes. At the end of September the day students had not all reported, so there is still room in that class for more men. This room will probably be taken before the end of the term. For particulars of the school address Andrew F. Johnson, 20 W. 44th street, New York City.

TO MAKE BEARINGS AND WORMS IN TOLEDO

For the purpose of making bearings and worm gears for automobiles, the Bock Bearing Co. has been organized in Toledo with W. E. Bock as its president. It has secured a factory site at Phillips avenue and Michigan Central Railroad, on which will be erected a one-story plant, 62 x 225 feet.

MICHIGAN BUGGY CO. TO GO AT AUCTION

Samuel L. Winternitz & Co., of Chicago, the big wrecking concern, will sell at auction the movable machinery of the Michigan Buggy Co. plant on a 12½ per cent. basis, guaranteeing the creditors $225,000. The wrecking company estimates that the plant will bring nearer $300,000.

The plant of the Velie Motor Vehicle Co., of Moline, Ill., is undergoing enlargement to the extent of 120,000 square feet; the addition to the plant consists of a two-story building.

STUDEBAKERS MAKE A NEW MOVE

With the increasing trend of business uptown it is interesting to learn that the Studebakers have decided to abandon their warerooms in West 52d street and move down town to 443-445 Broadway, near Canal street, in order to meet the change in trade conditions which has occurred within the last ten years.

So far as known, this is the only instance in which a business house has moved down town. The determination of Studebaker to open warerooms down town is governed by the same cause which impelled the organization to start its movement uptown more than a decade ago.

In those days the trade in heavy carriages was at its zenith. Now, however, the conditions are changed. More and more people are becoming country dwellers, and the demand is for vehicles of different character from those used years ago. In place of broughams and victorias the Studebakers are selling the lighter types of carriages and wagons which are favored for pleasure driving and errand work at suburban homes and country estates.

Then, too, there is an increasing demand for municipal vehicles. Under this division may be named sprinklers, street sweepers, dump carts, etc. With the increase of population, more tradesmen of all sorts were necessary, and these tradesmen had to have delivery wagons, and where one delivery wagon was sold ten years ago a dozen delivery wagons are sold today. The motor vehicle has made no impression on this branch of the trade.

Contractors, builders and road makers had to be supplied, and the increase in the number of men who are able to keep town houses and country houses, estates and small farms caused a demand for light farm wagons. The Studebakers say that the falling off of the city vehicle trade was never noticed. The use of utilitarian vehicles grew so rapidly that every year the demand for horse-drawn carriages and wagons has been greater than it was the year before.

And it is for the reason that their trade today lies among gentlemen farmers, owners of estates, contractors and municipal officials, truckmen, builders and business men that the house of Studebaker is going down town. Another reason is that Broadway and Canal street is a focal point where the avenues of trade meet. Truckmen have reduced hauling to a science within recent years. The narrow streets and congested thoroughfares down town do not lend themselves to haulage by automobile trucks. Trucking can best be accomplished by horse and wagon.

The harness trade is another branch of the business Studebaker can better handle from a downtown repository.

The new warerooms will be complete. There is more than 30,000 square feet of floor space and the warerooms extend through from Broadway to Mercer street.

It is interesting to note that Studebaker has followed the course of trade in New York City during the 23 years the house has maintained warerooms there. The first repository was at 81 Murray street. Studebaker did business there for two years. Then the business was transferred to 265 Canal street. Five years later a move was made to Broadway at Prince street. Six years after that carriage trade centered in the Forties and Studebaker moved to Broadway and 48th street. For eight years the firm remained at this then desirable location and from there moved to 52d street near Seventh avenue, where business has been transacted for three years.

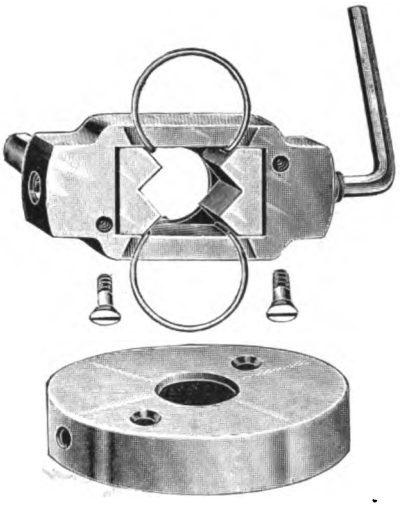
In the meantime territory between Columbus Circle and 42d street has become the center for the automobile trade. And carriage men know that there is a gulf fixed between the automobile trade and the horse-drawn vehicle trade. As George Ade remarked, "They don't Mocha and Java for a cent."

The automobile division of Studebakers maintains salesrooms at Broadway and 59th street.

A SAFETY LATHE DOG

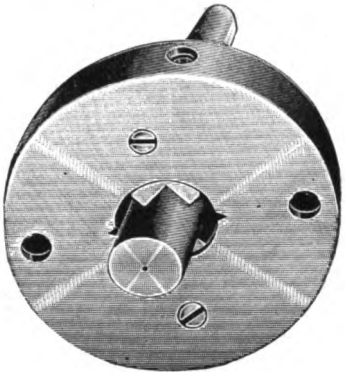
The effort to make machinery, and especially its attachments, more nearly immune to accidents to workmen, is here exemplified in a safety lathe dog named "National," and made at Oneida, N. Y., by Oneida National Chuck Co.

Two illustrations show (1) the internal arrangement of the



tool, and (2) the action of the jaws on the stock, in this case a bar of round material. The clutch is just as firm on square and flat stock.

It will be noted that the face is covered by a steel casing, circular, giving perfect security to operator because of absence of any projecting surface, drivers projecting from rear of body.



The opening and closing mechanism are controlled by two set screws.

The safety factor rests in the completeness of smoothness of face. Nothing to strike, catch or tear.

Mechanically its adjustable jaw is the feature that allows of perfect centering and true running. It is all simple, strong and durable.

BEEBE MAKES PARTIAL SETTLEMENT

John D. Beebe, former general manager of the bankrupt Midland Motor Co., of Moline, Ill., who was arrested in Chicago on a charge of embezzling the company's funds, and taken to Moline for trial, effected at least a temporary settlement and has been released.

FIRST DIVIDEND FOR STREATOR CREDITORS

The trustee in bankruptcy of the Streator Motor Car Co., of Streator, Ill., has declared a first dividend of 15 per cent. It is expected that when the affairs of the bankrupt are wound up the creditors will have received between 35 and 50 per cent. of their claims.

A GOOD VEHICLE YEAR

Ten thousand more jobs were turned out by the Wright Carriage Body Co., of Rock Island, Ill., in the fiscal year just closed than in any other year in the company's history, according to reports read at the meeting of the stockholders. The total number of completed jobs for the year was 42,000. The coming year should be equally prosperous, according to E. H. Wilson, secretary and general manager. The company will have 3,000 additional square feet of floor space for manufacturing purposes, as a result of improvements which will be finished in three weeks. Following are the directors elected: T. M. Sechler, Fred Peters, J. S. Gillmore, W. L. Velie, W. L. Mueller, G. H. Wilson and C. H. Dooley.

E. S. Ziegler, secretary and treasurer of the Hoover Wagon Co., York, Pa., stated that the company has had the most successful spring and summer season since 1907. The plant is still very busy and is working to its fullest capacity in the various departments. Shipments of commercial vehicles are being made daily to all parts of the country.

The Wellsboro (Pa.) Carriage Co. has had the most prosperous season in its history. It has sold all the buggies and light wagons in stock and is today a hundred wagons behind orders.

People are buying carriages, buggies, and other light vehicles in large quantities. One hundred workmen are working full time and have been all summer in the George Delker Buggy Co.'s factory at Henderson, Ky., to keep up with orders. During the month of August the firm sold 734 jobs at wholesale and over 100 vehicles at retail. Officials of the company say it was the biggest business in the history of the firm during any month of August. The wholesale business is looked after by George W. Dean, who travels in Kentucky and Tennessee; George W. Adams, who covers Illinois, Missouri, Arkansas and Texas, and Jacob Zimbro in Indiana.

MORE ABOUT SOUTHERN VEHICLE LEAGUE

After our first report concerning this new organization, we learn that the dues are $10 per year, that the central office and place of meeting will always be Charlotte, N. C.; that a credit bureau is to be organized by assessment on members after this fashion: Any manufacturer having an annual output of 2,500 vehicles or less should pay an annual fee of $100, payable $25 quarterly in advance, and any manufacturer having an annual output exceeding 2,500 jobs should pay an annual fee of $200, payable $50 quarterly in advance. Fiscal year to begin July 1, 1913.

The following resolution was introduced and signed:

We, the undersigned, hereby associate ourselves together, under the name of The Vehicle League, agreeing and pledging ourselves to abide and maintain such rules and regulations as are adopted by the majority and to pay such assessments as are needed to maintain our organization.

Hale Buggy Co., by D. P. Hale, Anniston, Ala.
Barbour Buggy Co., by R. S. Barbour, South Boston, Va.
Hackney Bros., by George Hackney, Wilson, N. C.
Corbitt Buggy Co., by R. J. Corbitt, Henderson, N. C.
Rock Hill Buggy Co., by J. G. Anderson, Rock Hill, S. C.
Oettinger Buggy Co., by E. M. Oettinger, Greensboro, N. C.
Ellis Carriage Works, by L. M. Roque, Kinston, N. C.
Rowland Buggy Co., by S. K. Rowland, Sumter, S. C.
A. Wrenn & Sons, Inc., by A. L. Black, Norfolk, Va.
Delker Bros. Buggy Co., by F. H. Delker, Henderson, Ky.
Oxford Buggy Co., by B. F. Taylor, Oxford, N. C.
Knight Buggy Co., by J. R. Knight, Franklin, Va.
Taylor-Cannady Buggy Co., by N. H. Cannady, Oxford, N. C.
High Point Buggy Co., by H. A. White, High Point, N. C.
Piedmont Buggy Co., by O. W. Kochtitzky, Monroe, N. C.
Carolina Buggy Co., by W. B. Waddill, Henderson, N. C.
Durham Buggy Co., by W. T. Minor, Durham, N. C.

Other manufacturers requested further time for consideration, but expressed full unity with the purpose of the organization.

TIRE MAKERS ABSENT AT NATIONAL SHOWS

Tires, which have constituted one of the conspicuous displays in the accessory department of the National shows in New York and Chicago, in all probability will be even more conspicuous by their absence from the shows of next January. For it has just become known that the tire group of the Motor & Accessory Manufacturers, Inc., has reached an agreement not to exhibit at either New York or Chicago.

It is understood also that few of the bearing manufacturers will exhibit their productions at either of the shows. It is known that, like many other manufacturers of parts and accessories, the tire people have obtained comparatively no real benefit from their displays and that each of them has participated in the shows largely because of knowledge that the "other fellow" intended to display, and for such passing advertisement as they might secure.

Despite the withdrawal of the tire manufacturers, however, it is stated that the M. A. M. will take all the space which has been set aside for their occupancy at both New York and Chicago.

It has also just become known that the M. A. M. for the first time has refused to sanction the Boston show, and while it is possible that pressure which is being brought to bear may influence a change of the decision, it is more likely that the Boston exhibition will have to get along without M. A. M. approval.

W. J. MILLS LEAVES FOR ISLE OF PINES

Wm. J. Mills, Watertown, N. Y., well known in the carriage and vehicle industry, has resigned from the Babcock Company, of Watertown, N. Y., as vice-president and treasurer, and about October 1 sailed from New York for the Isle of Pines, where he has large interests. Mr. Mills has been prominently identified with the vehicle industry of Watertown for the past 20 years. In 1896 he was made secretary, treasurer and general manager of the Watertown Carraige Co., which position he continued until that concern was absorbed by the H. H. Babcock Co. Mr. Mills continued in the same position with the latter concern. Mr. Mills' relations with the Babcock Company are thoroughly cordial and pleasant, and he still retains his stock in the concern. The best wishes of his friends follow him to his new home.

SUE FOR ROYALTIES

Although the Swinehart Tire & Rubber Co., of Akron, O., was allied with Edwin B. Caldwell, a Detroit banker, Frank J. Johnston, a Detroit business man, and Frank M. Ashley, a New York lawyer and inventor, in a suit brought some time ago for infringement of patent No. 887,997 in the use of Motz under-cut tires, the three owners of the patent have fallen out with the Swinehart company and are acting alone in a new suit filed early in September in the United States District Court for the Southern District of New York against the Motz Tire & Rubber Co., of Akron.

MORGAN & WRIGHT ADDITION

Morgan & Wright have taken possession of their immense new plant which recently was completed in Detroit and which provides 400,000 square feet of additional floor space. A duplicate of the new building will be ready for occupancy about April 1 next.

PERSONAL

L. L. King has been appointed advertising manager of the Goodyear Tire & Rubber Co., of Akron, and will take over most of the duties previously performed by H. S. Quine; the latter will hereafter act more as a direct assistant of President Seiberling.

The management of the Philadelphia branch of the Republic Rubber Co.—left open by the disappearance some time ago of J. W. Lyman—has been filled by the appointment of B. C. Swinehart, former manager of the Cleveland division, to that post. The business of this company in the northwest will hereafter be taken care of from its station at 13th and Hennepin avenues, Minneapolis, Minn., to which point it has moved from St. Paul.

C. A. Hamilton has been elected president of the Racine Mfg. Co., the body building concern located in the Wisconsin city of that name. He succeeds Frank K. Bull, who retired in order to devote himself wholly to the J. I. Case T. M. Co., of which he is the head. Previously Hamilton was vice-president of the Lavigne Gear Co., of Racine, and at one time he was associated with the Wisconsin Engine Co.

W. W. Calahan, who has been identified with the Goodyear sales department for six years, has been appointed manager of the Goodyear branch in Milwaukee. He succeeds Herbert P. Ziegler, who has been transferred to the Chicago branch.

CINCINNATI CARRIAGE MAKERS MEET

The Cincinnati Carriage Makers' Club held its first monthly dinner of the season the night of Sept. 11, at the Blue Grass Inn. About 55 of its members were present to hear addresses from the president, P. P. Hunter, of the American Carriage Co., and Secretary A. S. Brown, of the Summitt Thread Co. The speakers said that business for this season looked brighter than it has for several years past.

The next meeting will be held at the Blaine Club, October 10, when arrangements will be completed for the local delegation to attend the national convention of the American Carriage Makers' Association, to be held at St. Louis October 13 to 18. A special train will carry the Cincinnati delegation.

BLACK LICENSE TAGS FOR PENNSYLVANIA

Pennsylvania's automobile license tags for 1914 will be black with white letters and figures instead of olive with white letters, as at present, and there will be six classes of tags issued. Pleasure cars other than those operated by dealers are in the first class; commercial vehicles are in the second class, with five sub-divisions according to weight; dealers' vehicles come in the third class and the tags will be distinguished by the letter X; traction engines constitute the fourth class, the plates for them carrying the letter E in front of the number; trailers, or vehicles that are being hauled, constitute the fifth class, and their plates will have the letter T before the number; motorcycles are in the sixth class by themselves.

FELTON, SIBLEY & CO. CELEBRATE FIFTIETH ANNIVERSARY

In commemoration of the fiftieth anniversary of the establishment of their business as paint and varnish manufacturers, Felton, Sibley & Co., Inc., Philadelphia, celebrated the event at their new varnish factory, Nineteenth and Hayes avenue, Camden, N. J., on Friday, September 5. The main features of the affair were a dinner to the members of the organization and a few invited guests, and a distribution of cash among the employes according to years of service.

GEORGE W. BENNETT

George W. Bennett, general manager of the Willys-Overland Co. and of John N. Willy's other interests, died at his home in Toledo, September 17, as a result of an operation for appendicitis.

Bennett so long has been one of the conspicuous strong men of the industry, and as it was not generally known that he had undergone the operation, the news of his death proved a profound and widespread shock. The sad news awaited John N. Willys when he arrived in New York after several months' stay in Europe.

Bennett's loss is no ordinary loss, and as Willys had vested him with almost complete power in the actual conduct of his business, his passing will be felt. He is survived by his widow and two boys, both of whom are in their teens.

EWING STUDEBAKER RILEY WEDS

Ewing Studebaker Riley, of Independence, Kas., and Miss Jessie Carter, a former actress, were married in the Buckingham Hotel, St. Louis, September 15. The bridegroom is the grandson of Peter Studebaker, and his father is auditor of the Studebaker corporation. He met Miss Carter when she was leading woman in the Auditorium Stock Company, in South Bend.

After their wedding journey Mr. Riley and his bride will live in Independence, where the bridegroom is engaged in business.

SPORTING TRADE NEWS IN "AXIS"

The "vacation number" of the Banner Buggy Co.'s "Axis" is full of interesting reading matter, among which is an article by Russell E. Gardner, president of the company, telling how he witnessed a fight between two big bucks on his Arkansas game preserve, and also how he succeeded in bringing home both the bucks after the fight was over. This number of the "Axis" also contains an article on the history, manufacture and uses of varnish.

RECEIVERS FOR ROYER WHEEL COMPANY

Losses sustained during the floods of last spring are the cause given by the Royer Wheel Co., of Cincinnati, O., in the insolvency court in asking for a receivership. Judge Warner has appointed John W. Herron, Jr., the president of the company, and Philip Hinkley as co-receivers, and the business will be continued under their management. According to Mr. Herron the assets of the business are $300,000 and the liabilities are $270,000.

JANUARY DATES CHOSEN FOR IMPORTERS' SHOW

January 2 to 10 have been chosen as the dates for the Importers' show which, as usual, will be held in the ballroom of Hotel Astor, New York. Also, as usual, it will be managed by Stefan Kjeldsen, secretary of the Importers' Automobile Salon. The dates are the same on which the show has been held in former years, but for the first time they will run concurrently with those of the Automobile Chamber of Commerce's show in Grand Central Palace.

NEW TIRE PLANT

The Greensburg Tire & Rubber Co., July 17, 1913; under the laws of Pennsylvania; authorized capital, $100,000. Incorporators: George S. Rombaugh, W. Dunbar and John B. Hayden, all of Greensburg, Pa. Location of principal office, Greensburg, Pa. To manufacture and sell automobile tires and tubes and other rubber goods.

Trade News From Near and Far

NEW FIRMS AND INCORPORATIONS

Otto Hoese has opened a stock of vehicles, etc., in Dixon; Neb.

P. W. Myron has opened a new stock of vehicles, etc., in Hettinger, N. D.

T. N. Sheaff & Son are about to open a stock of vehicles, etc., in Belgrade, Neb.

Rassmussen & Miller are opening a new stock of vehicles in Blooming Prairie, Minn.

L. M. Jewell has again engaged in the carriage and implement business in Winchester, Kas.

Walton & White have engaged in the vehicle and implement business in Neosha Falls, Kas.

Jacobson & Peterson have engaged in the vehicle and implement business in Makoti, N. D.

The Mesick-Stangeland Co., of Gettysburg, S. D., has opened a branch vehicle house in Napoleon, N. D.

Fulmer & Brittain, recently of San Antonio, Tex., have opened a new store in Sherman, Tex.

The Wisconsin Vehicle Co., of LaCrosse, Wis., is reported about to open a branch in Minot, N. D.

The Philip Forschler Wagon & Mfg. Co. has been incorporated in New Orleans, La., with a capital stock of $10,000.

S. G. Gay Company, Ottowa, Ill., capital $200,000, to manufacture carriages, buggies, motor vehicles, etc., has been incorporated by Simeon G. Gay, Chester T. Bangs, L. W. Nichols.

The Glen Wagon & Car Corp. has been incorporated at Cortland, N. Y., to manufacture and deal in wagons and road making machinery; capital $120,000, by H. M. Glen, Seneca Falls; J. R. Manning, T. R. Clark, Marathon.

The Loudon Limousine Co., of Hempstead, N. Y., has been incorporated to manufacture and sell detachable auto bodies, etc. The capital stock is $10,000, and the directors are John A. McAvoy, Charles U. Stowe and Anna M. Stowe, of Hempstead.

The F. O. Bailey Carriage Co., at Portland, Me., has been incorporated with a capital stock of $50,000. President, Frederick O. Bailey; clerk, Will A. Gilman; treasurer, W. A. Gilman; directors, F. O. Bailey, Neal W. Allen, Charles W. Phinney, W. A. Gilman and A. W. Coombs.

J. W. McLaughlin, formerly of Denver, and Peter J. Frank, formerly of Detroit, have formed a partnership as the Ogden (Utah) Carriage Co. and leased the old overall factory at Washington avenue and 17th street. The building is being remodeled and prepared for use as a carriage and automobile repair and painting house.

The Parlor City Carriage Works has been organized at Cedar Rapids, Ia., by Roy E. Flegar, Edward Cornoldy and Jos. G. Loufek. A new building is being erected which will cost about $4,000. It will be 75 x 40 feet, and two stories high. The material will be brick and concrete, and the construction according to modern plans of carriage works building.

BUSINESS CHANGES

A. C. Cole has purchased the business of M. L. Olinger, in Maxwell, Ia.

W. Margritz has purchased the Gilson stock of vehicles, etc., in Ravenna, Neb.

A. G. Streeter has purchased the stock of buggies, etc., of G. H. Shank, in Hecla, S. D.

M. T. Elliott has disposed of his stock of vehicles, etc., in Lynch, Neb., to P. P. Carroll.

Heilman & White have purchased the stock of buggies, etc., of Horton & Co., in Cushing, Ia.

A. C. Drace has purchased the stock of vehicles, etc., of Tony Keeting, in Keytesville, Mo.

Aaron Anderson has disposed of his stock of buggies, etc., in Veblen, S. D., to C. H. Hantho.

Edward Olcott has succeeded to the vehicle business of Olcott & Snell, in Red Lodge, Mont.

Charles Young has purchased the stock of vehicles, etc., of Richard Dodsworth, in Mt. Hamill, Ia.

Charles Tiede, of Enterprise, Kas., has purchased the vehicle stock of Bricker & Co., in Russell, Kas.

B. J. Allen has been succeeded in the buggy and implement business in Hoyt, Kas., by W. A. Snapp.

The Scuhltz Mercantile Co. has succeeded to the business of Bork Bros. & Schultz, in Revillo, S. D.

E. W. Bottomley has succeeded to the stock of vehicles, etc., of Glindinning & Bottomley, in Iroquois, S. D.

IMPROVEMENTS AND EXTENSIONS

Bert Edwards is erecting a new vehicle and implement store in Salem, Ia.

C. B. Hotchkiss has begun the erection of a new vehicle repository in Gering, Neb.

Harris Bros. have let the contract for the erection of a new vehicle and implement store in Moorhead, Minn.

The Patterson Mfg. Co., wagon makers of Holly, Mich., have increased their capital stock from $50,000 to $75,000.

Battershell Bross., vehicle and implement dealers of Pocahontas, Ia., have begun the erection of an addition to their building.

The Wisconsin Vehicle Co., of La Crosse, Wis., contemplates locating a branch plant in Minot. The company manufactures farm wagons, light runabouts and rigs.

The Hess Carriage Co., Hagerstown, Md., is building an addition to its building to replace the one destroyed a few weeks ago. The new building will be 102 x 48 and will be built of concrete blocks.

The Rhoades Wagon Co., Anderson, Ind., is erecting a new building which is made almost entirely of concrete; is two stories high and measures 24 x 100 feet. The lower floor will be used as a store room for finished wagons and buggies. The top floor will be occupied by the paint shop.

Harry L. Yingling, proprietor of the Yingling Auto-Carriage Works, Hagerstown, Md., has completed a handsome new structure to replace his old one. The building, which is two stories, and is practically fireproof, is 37 x 65 feet. On the first floor is situated the office, a varnishing room and a general work shop where the first work is started and on the second floor is another varnishing room where the finishing touches are applied, and a large room for painting and storing. The cellar of the building, which is of concrete, will be used for storing paints, etc. At the rear of the main shop is situated the blacksmith shop, which later will be under the same roof.

EBERHARD ENLARGES PLANT

The Eberhard Manufacturing Co., Cleveland, Ohio, is preparing to construct an addition to its plant. The new

structure will cost about $17,000. It will be brick, 45 feet wide by 215 feet long, two stories high. The first floor is to be used in the nickel plating of goods turned out and for storage. The second floor will contain the buffing and polishing rooms.

FIRES

Fire destroyed the plant of the Leader Buggy Co. at Cleveland, O.

Fire did about $5,000 damage to Cedar Rapids (Ia.) Carriage Works on September 11.

The vehicle repository of A. E. Krupicka, in Ohiowa, Neb., has been destroyed by fire.

The stock of vehicles, etc., of F. Smith & Co., in Upton, Ky., has been destroyed by fire.

The stock of wagons of Thompson Bros. & Irwin, in Harlan, Ia., has been destroyed by fire.

The stock of carriages, etc., of G. R. Smith, in Elizabethtown, Ky., has been destroyed by fire.

E. J. Singer, the vehicle and hardware dealer of Liberty Mills, Ind., has suffered a severe fire loss.

About $5,000 damage was caused, September 15, by a fire in the Dann Brothers Carriage shop at New Haven, Conn.

The stock of vehicles of J. A. Dolbech, in Terrill, Ia., has been destroyed by fire.

The plant of the Washington Buggy Co., of Washington, N. C ,has been damaged by storm to the extent of $10,000. Repairs are now being made.

Fire at the Hess Spring & Axle Co.'s plant at Pontiac, Mich., did damage estimated at $5,000. The fire started in the roof of the axle building from sparks from a passing engine.

The Florida Hickory Wagon Works, Tallahassee, Fla., were completely destroyed by fire. The company will rebuild and resume operations at the earliest possible date. Work has already begun.

NEWS OF THE AUTO TRADE

W. Merritt has engaged in the automobile business in Ponca, Neb.

The Halsey Automobile Co. will erect a three-story sales building in St. Louis, Mo.

The Reid Auto Co. has been incorporated in Louisville, Ky., with a capital stock of $5,000.

The Wyllis-Overland Automobile Co., of St. Louis, Mo., is about to erect a sales building.

The Henrico Car Co. has been incorporated in Richmond, Va., with a capital stock of $50,000.

Mr. Tomlinson has succeeded to the automobile business of Noyes & Tomlinson, in Kearney, Neb.

The Grant Motor Co., of Detroit, Mich., has increased its capital stock from $165,000 to $200,000.

The Hupmobile Sales Co. has been incorporated in Oklahoma City, Okla., with a capital stock of $5,000.

The Thorp-Allen Motor Co. has been incorporated in Kansas City, Mo., with a capital stock of $10,000.

The Haynes Motor Sales Co. has been incorporated in Charlotte, N. C., with a capital stock of $25,000.

The St. Francois Motor Co. has been incorporated in Farmington, Mo., with a capital stock of $4,000.

The Anselm-Ganahl Motor Car Co. has been incorporated in St. Louis, Mo., with a capital stock of $5,000.

The Palmer-Meyer Motor Car Co. has been incorporated in St. Louis, Mo., with a capital stock of $100,000.

The Princess Cyclecar Co. has been incorporated in Detroit, Mich., with a capital of $10,000, to manufacture automobiles.

The Universal Motor Car & Supply Co. has purchased the business of the Texas Motor Car & Supply Co., in Yoakum, Texas.

OBITUARY

William T. Bowers, 76, one of the pioneer carriage manufacturers of Baltimore, Md., died suddenly, September 11, at his home, 110 Virginia avenue, Arlington, of apoplexy. He had not been very strong since his retirement from business in July. At that time the old firm of William Bowers & Sons was merged with the J. S. Ditch Company, forming a new firm called the Ditch, Bowers & Taylor Co. He was born in Baltimore, and with his wife, he celebrated the fiftieth anniversary of his wedding just four years ago. His father, the late William Bowers, who died about 10 years ago, lived until

Malcolm Gillis, 60, at one time engaged in the wagon making business in Pennsdale, and then Hughesville, Pa., died at the latter place, September 24, of apoplexy. In the past few years he interested himself in the auto business in Williamsport, Pa. he was 92 years old and was the founder of the firm of William Bowers & Sons, which was established in 1836. In 1852 the younger Bowers became identified with the firm, in which he remained until this year. Besides his widow, he is survived by six children and 15 grandchildren.

Joseph F. Michel, a wagon builder, died of heart disease, September 24, as he entered his place of business at 2215 Callowhill street, Philadelphia, Pa. For more than 30 years he had been engaged in the building of vehicles in that city. He was born in Switzerland 54 years ago. At the age of 16 years he went to Philadelphia, and first entered the wagon business at the age of 21 as a member of the firm of Michell, Swarz & Keachline. Several years ago he opened a business at 22d and Callowhill streets under the name of J. F. Michel & Son. He was a promient figure in local horse shows and claimed the distinction of being the first man to drive the four-in-hand brake, which later became one of the famous types of vehicles. His widow, with two sons and one daughter, survive. The home is in East Hinckley street, Ridley Park.

Frank P. Mills, 59, southern and western representative of the Standard Wheel Co., Terre Haute, Ind., died very suddenly at the Genesta Hotel, Augusta, Ga., on Wednesday, September 10, from apoplexy. Mr. Mills was born at Southport, Conn., but removed to New Haven at an early age and became identified with the carriage business, which he followed all his life. For about 25 years he was connected with the New Haven Carriage Co. and was also with the New Haven Wheel Co., at one time a well known concern. While he lived in New Haven Mr. Mills was prominent and popular. He served the city for two terms as councilman when the city council was composed of two branches. He was a member of the Red Men and of the New Haven Grays, Connecticut's crack military organization, and of Terre Haute Council No. 188, U. C. T. Mr. Mills is survived by a widow and three daughters. Mr. Mills had been with the Standard Wheel Co. for the last twelve years. He had a host of friends among the carriage and heavy hardware trade.

George E. Nissen, 73, died at the home of his daughter in Winston-Salem, N. C., September 19, of Bright's disease. He was the son of Phillip Nisson, founder of the Nisson Wagon Works, and with his brother succeeded to the business upon his father's death. About four years ago, his health failing, he sold out his interest in the business to his brother. He was a veteran of the civil war fighting on the confederate side.

Elbert N. Remson, vice-president of the I. S. Remsen Manufacturing Co., builders of carriages and automobiles in Brooklyn, N. Y., died from paralysis September 26 at his home, 265 Monroe street, Brooklyn. He was 67 years old and was a brother of the late I. S. Remsen. Mr. Remsen never fully recovered from the shock of the death of his son, Clarence,

26 years old, who was drowned two years ago in Long Island Sound.

H. Emmett Redman, 58, died September 10, the result of a stroke of paralysis which came upon him August 31. Mr. Redman was secretary of the Mitchell-Lewis Motor Co., the well known manufacturers of automobiles and wagons in Racine, Wis. The deceased was born in Louisville, Ky. He went to Racine 30 years ago and was made credit manager of the Mitchell-Lewis Wagon Co., which later was reorganized as the Mitchell-Lewis Motor Co.

John M. Skinner, 68, president of the Skinner Bending Co. and of the Toledo Wheelbarrow Co., of Toledo, O., died October 2, from a complication of diseases. Mr. Skinner began failing in health two years ago, since which time, in company with his wife, he made several extended trips in the hope of regaining his health. Mr. Skinner was born in 1845 at McKean, Erie county, Pa. After leaving college, he returned to his father's farm, where he remained until his marriage in 1872. He then went to Erie, Pa., where he became connected with the Fink Bending Co., and later with the Hostetter wholesale shoe company. In 1884 he moved to Toledo and entered into a partnership with the Brigham Lamson Bending Co., that was afterwards the Lamson & Skinner Bending Co. After the death of Mr. Lamson Mr. Skinner purchased the entire stock of the concern, and it has since been known as the Skinner Bending Co. Beside being president of two Toledo concerns, he was also at the head of the Arkansas Bending Co., of Stuttgart, Ark. He leaves his wife, a son, Claire V. Skinner, and two daughters, Mrs. Frank Anderson and Mrs. George Dugan, the latter of Albany, N. Y.

Horatio Tilton, 70, for many years in the carriage making business at Long Branch, N. J., died September 11 after an operation for intestinal troubles. One son survives.

Charles Killiam Van Rensselaer, 65, proprietor of the Chas. D. Thum Brush Mfg. Co., Philadelphia, died September 25, of heart disease. He was born in Troy, N. Y., and moved to Philadelphia at the age of 20. He is survived by his wife and three children.

William Wensing, 68, wagon maker at Dorchester, Minn., died August 18. He was born in Germany, coming to this country as a boy and first located in Wisconsin. He moved to Dorchester in 1866 and began making the Wensing wagon two years later. Three children by his first wife survive him, also his second wife and five children.

WANTS

Help and situation wanted advertisements, 1 cent a word; all other advertisements in this department, 5 cents a word; initials and figures count as words. Minimum price, 30 cents for each advertisement.

PATENTS

Patents—H. W. T. Jenner, patent attorney and mechanical expert, 606 F St., Washington, D. C. Established 1883. I make a free examination and report if a patent can be had and exactly what it will cost. Send for circular.

HELP WANTED

Wanted—Two experienced body makers for heavy work. Only first class, steady, experienced men need apply. Riddle Coach & Hearse Co., Ravenna, Ohio.

SITUATIONS WANTED

Wanted—Foremanship in carriage, wagon or automobile shop by a man who is competent in blacksmithing, woodworking and painting and understands trimming; can make own drafts if required; prefers position in the east. Address M. L., care The Hub, 24 Murray St., New York.

TREATMENT OF STEEL BY SPRING MAKERS

In some cases the physical condition of the metal is different in the various parts of the length of a given leaf. This condition should not exist in a spring any more than in a transmission gear. The difficulty is that a spring is long and thin, rendering it difficult to have all parts of the length uniformly heated or uniformly cooled. There are, however, manufacturers who secure uniformity between the various leaves and in any one leaf. To do so old methods are departed from.

The remedy is that the manufacturer must select those companies who do treat the steel properly.

An estimate of the quantity of tires that will be needed to equip the 1913 output of the Ford factory places the number at 800,000. This would indicate that the Ford people expect to market about 200,000 cars this year.

INDEX TO ADVERTISERS

EVERY·AUTOIST·A·CUSTOMER·&·EVERY

THAT'S what you want, friend DEALER, and that's good news involved in the handling of

THE RACINE AUTO TIRE

We'll tell you why!

BECAUSE, your customer will not be worried by seeking to avoid the many sharp things that puncture other tires, for they won't puncture THE RACINE as it takes a pressure of over 4,000 pounds to puncture the chrome tanned leather outside jacket.

BECAUSE, your customer will find it unnecessary to carry that extra tire; four good revolving tires (RACINE AUTO TIRES) being all he will need.

THE FAIRFIELD RUBBER COMPANY

Manufacturers of

Carriage Cloth, Imitation Leather,
Automobile Cloths, etc.

FAIRFIELD, CONNECTICUT

KEYSTONE BLACK FILLER

MAKES A PERFECT

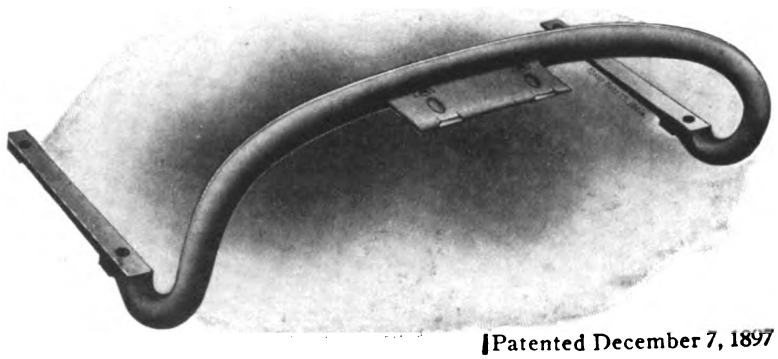
ROUGHSTUFF

For Automobile Bodies and Parts

It fills the pores of Metal and Wood perfectly. Sand-papers easily and produces a fine, smooth surface that DOES NOT CRACK, SCALE NOR PEEL.

POMEROY & FISCHER, New York
Selling Agents to Vehicle Trade

KEYSTONE PAINT AND FILLER CO., Muncy, Pa.



Patented December 7, 1897

Bailey Body Hanger

BUGGY and SURREY SIZE

QUICK SHIPMENTS

WRITE FOR PRICES

The Keystone Forging Co.

Northumberland, Pa.

The Hub

Entered in the New York Post Office as Second-class Matter

Vol. LV NOVEMBER, 1913 No. 8

THE TRADE NEWS PUBLISHING CO. OF N. Y.
Publishers of THE HUB

J. H. WRIGHT, *President.* G. A. TANNER, *Secretary and Treasurer.*
24-26 MURRAY STREET, NEW YORK.

Other Publications of Trade News Publishing Co.:
HARNESS (monthly).....per year, $1.00
AMERICAN HARNESS AND SADDLERY DIRECTORY (annual).....per copy, $4.00

THE HUB is published monthly in the interest of employers and workmen connected with the manufacture of Carriages, Wagons, Sleighs, Automobiles and the Accessory trades, and also in the interest of Dealers.

Subscription price for the United States, Mexico, Cuba, Porto Rico, Guam, the Philippines, and the Hawaiian Islands, $2.00, Canada, $2.50, *payable strictly in advance.* Single copies, 25 cents. Remittances at risk of subscriber, unless by registered letter, or by draft, check, express or post-office order, payable to the order of TRADE NEWS PUBLISHING CO.

For advertising rates, apply to the Publishers. Advertisements must be acceptable in every respect. Copy for new advertisements must be received by the 25th of the preceding month, and requests to alter or discontinue advertisements must be received before the 12th day of the preceding month to insure attention in the following number. All communications must be accompanied by the full name and address of writer.

FOREIGN REPRESENTATIVES:

FRANCE.—L. Dupont, publisher of *Le Guide due Carrossier,* 78 Rue Boissiere, Paris. Subscription price, 15 francs, postpaid.

GERMANY.—Gustave Miesen, Bohn a Rh. Subscription price, 12 marks, postpaid.

ENGLAND.—Thomas Mattison, "Floriana," Hillside Avenue, Bitterne Park, Southampton. Subscription price, 12 shillings, postpaid.

Entered in the New York Post Office as Second-class Matter.

"Everything Is Lovely, and the Goose Honks High"

The C. B. N. A. convention was really a love feast.

Through careful boiling down of the report we have produced an essence that gives the concentrated flavor of optimism that was a tincture that colored every thought, publicly or privately expressed.

The concensus of opinion was even jovial in its cheerfulness. It was as if the buggy had lost something, but found it again. The year was closing in a most satisfactory way financially. A money-maker is always in good humor.

A sentiment that seemed to be pervasive was the thought that there had been a king in Egypt that knew not Joseph, but that Joseph had now established himself on solid ground, and, if he felt in impolite humor, he could afford to make grimaces at the king; in short, the buggy had come into its own, etc., once again.

It is true the buggy trade has had its lean years. They come to all, but are more fairly attributable to general rather than special conditions. Business is much like a slice of bacon, with its streak of lean and streak of fat.

While the horse-drawn vehicle is enjoying its streak of fat this year, another branch of the vehicle business, the motor car, is munching on its streak of lean, about the first it has had to digest, and its zest is just about what the buggy brother felt.

The feeling just now is very pronounced in the business that there is not, or can there be, the least community of interest between the work of making the two classes of vehicles.

This is the conclusion that has been arrived at by the practical men in the trade, and it is based on their producing and selling experience. They even take the ground that the "dealer," or distributors of the wares, must make a choice between buggy and motor car, and sell one or the other, not one and the other, as he may elect to do.

Such a very pronounced feeling must be based on conditions that have been found to prevail, and no doubt it is not a result of hasty conclusions. If something in the future business conditions does not come up to change this present cast of thought it will mean, of course, that the vehicle industry must be prosecuted for profit as two distinct branches, and in those instances, not so very rare, where the personal interest is divided between auto and buggy, there must be two factories, two organizations, and two distinct distributing agencies. Thus we have that specialization which is looked upon as the spirit of the times.

This stand indicates another interesting fact, and that is the very representative character of the Association itself.

When the highest grade pleasure vehicle was a dominant influence it was characteristic of the personnel of the Association membership, as well as its executive.

As the lighter vehicle and the buggy occupied the spot light, the personnel has also gradually changed to represent the new thought, and the Association is now truly a buggy association, and faithfully reflects such interests.

With this change the center of activity has changed. We now have two presidents of the organization from the west in succession. The old order was an alternative sectional presiding officer.

The Association continues to maintain the tradition of an alternate west and east meeting place, but even this old-established custom was broken through by the two successive Atlantic City conventions, and it came

very near being a trinity, as a stout sentiment was in favor of continuing there almost as a permanent practice, or at any rate, trying it over again in 1913.

The deductions to be drawn from the meeting may be summed up briefly. The feeling was cheerful to the point of pronounced optimism. The proceedings were on a level that reflected credit as a deliberative, but quasi social organization. The feeling was in favor of even more efficiency in the organization as such, and the exhibition of parts maintained as an adjunct of the Association, maintained its high average of excellence and merit.

A Novelty in Entertainment

It has long been a custom with the C. B. N. A. to have a Tuesday evening gathering in Association week, the purpose of which was to get together and renew old acquaintances as well as making new. This broke the social ice, as it were.

These gatherings were generally of a staid, almost formal character. They were rather stiff and uncomfortable at times, giving the feeling of a new pair of shoes.

This year at St. Louis a most excellent innovation was tried out, and if the plaudits and good words are to be taken as the test of success, it has set a standard of joviality that ought to be repeated at future gatherings.

The local St. Louis entertainment committee did a little hat passing on its own account, and the fund so gathered together was concentrated on making the Tuesday evening reception an epoch in such affairs.

The physical arrangements were splendid. The whole second floor of the Planters' Hotel was the exclusive property of the committee for the time being. Even the hotel elevators were forbidden to stop at that floor.

The professional entertainers engaged were of the best and most varied order of talent, and not for a moment was there a let-up. Something was doing continually, not merely in one spot, but in four or five places at once. It was like a four-ring circus for interest, and one could not tell which way to turn in the fear of missing something even better than was at the moment before the spectator.

Literally there was music in the air, because it was on tap almost everywhere. The kind of joy was suited to tastes sedate as well as lively, and the liking for the kind of entertainment provided was well attested by the fact that the attendance hardly diminished until the very end of the function.

This, it seems to us, constitutes a good pointer for the Accessory fund-raising association. It could be put to practical use in Atlantic City next year.

A concentration of resources on some such entertainment as St. Louis supplied would go far toward helping out the Tuesday evening meeting in the Marlborough-Blenheim, and, as we see it, be a vast improvement on the dull, not to say stupid, ladies' dinner on Thursday evening that seemed to be the best idea the Associates have so far been able to produce.

There is another very important merit in this concentration of resource on the Tuesday evening function. It gives the joy-dance at a time in the life of the meeting when interest in everything is young and keen in place of postponement to Thursday, when the controlling thought is that of making a getaway as soon as possible.

The opportunities for engaging talent from a vantage point like Atlantic City would make something very brilliant, probably. We would like to see it tried out.

Twenty-nine Years Ago

We illustrate a menu that is reminiscent of the good time that was enjoyed twenty-nine years ago when the Carriage Builders' National Association was in convention in St. Louis.

At that time the Southern Hotel was typical of southern hospitality. Its splendid lobby was big enough of itself to contain the members of two conventions, if necessary. Its hospitality was equal to any host.

How interesting it is to think of those good old times. The splend'd good fellow that were and that now are not! The generous, whole-souled Henry Timken. His strenuous efforts to see that all had a good time. The awful dust-choked drive to Shaw's Garden, and the delightful, gurgling products of the Southern's artist that washed that dust away.

The old oaken bucket kind of a barn at the Fair Grounds that housed the exhibits, and the fun we had when it rained just a little.

The strife of candidates, and our first acquaintance with the dulcet, fog-horn clarion that was the exclusive property of the voice of Charles Arthur Carlisle. What fun it all was.

The glorious reunions in the Executive Committee parlor. More like the meeting of a happy family of brothers, all out for the jolliest of larks, and meeting with no disillusions!

Then the banquet. What a brilliant scene as Gen. W. T. Sherman arose to speak to "Our Country."

And by the way. The quality and calibre of the banquet speakers we had in those days. Scan the list of names.

There may be occasions when imagination helps out an appreciation of ye goode olde tymes, but we feel sorry for those now present that they might not have been vouchsafed just one meeting with the men of those days, now a blessed memory to be forever cherished!

The Technical School

We are very much pleased to hear the best kind of reports from the Technical School for Carriage Draftsmen, operated by the assistance of the C. B. N. A. and the Mechanics' Institute.

The new school term, now in full swing, has attracted a good number of day scholars and an uncommonly good class of night pupils. It is too early to know much about the correspondence classes, but they generally give a good account of themselves.

Prof. Johnson, in that nice, quiet anti-friction way he

has, is keeping the young men on the hustle board, and we anticipate the best of results.

This school, as conducted, is one sure good place to acquire what is to be known about the art of carriage drafting. Nowhere can there be found such facilities. And to think it is all offered without price! The young, ambitious men of the trade are to be congratulated that such a chance is open to them.

The Light Weight Motor Car

An interesting development that will attract the attention of buggy builders who dabble in motor cars "on the side," is the movement abroad towards the vogue of the lighter car.

We have long known the merit of the light, firmly built buggy, that withstands shocks like whalebone, and is light enough to be pulled through difficulties.

The motor car makers have had to learn that weight was detrimental, but the lesson is just having a practical application.

All new movements in this field of the vehicle industry seem to find their sources among the men on the other side. The trade in this country appears to recognize that, and adapt itself to the movements that come from abroad.

This is true of styles as well as of constructions. We write in general terms, be it understood, because here and there among us are men of genuine originality, but like all such men, they are too far ahead of the thoughts of the day for copyists to catch up.

The light car in Europe is gaining much ground. We use the phrase light car as meaning a reduction in weight of the recognized car of commerce. We do not mean the cyclecar, that is following the lines of its own development, and must be light above all else or it is not a cyclecar.

But the engine builder is learning the lesson the carriage builder learned, that strength, combined with lightness was the ideal to strive for, and the effort is now in evidence.

It will be interesting to observe the movement. As the cars of little weight grow in number in the European shops, there is likely to be a reflex movement here, and we expect to hear a lot of "selling talk" along the line that Mr. Ford has made popular.

Now, if someone abroad would discover that the high, or buggy wheel, could be used to advantage, and should boldly proceed along such lines, and our builders would follow suit, as has been their habit, perhaps we would get a really comfortable-riding vehicle in the motor car at last.

When the "high-wheel buggy" with motor "fixins" had its brief life among us, we had an idea of how easy the thing would "ride," but we also had another lesson of the strength of fashion and cold storage prejudice congealed beyond any melting point.

We are now getting a new foreign impulse. It may do much that will be comfortable for the body and the pocket of all who have the motor car habit.

NEW IMPLEMENT AND VEHICLE ASSOCIATION HEAD

The National Implement and Vehicle Association's convention held at Peoria, Ill., October 22-24, closed with the election of officers given below. A number of resolutions were passed calling for new legislation in the handling, perfecting and selling of vehicles and implements. The following were elected: President, J. A. Craig, of Janesville, Wis. Vice-presidents: W. E. Taylor, Laporte, Ind.; W. F. Hoyt, Dowagiac, Mich.; William Louden, Fairfield, Ia.; B. P. Thornhill, Lynchburg, Va.; U. H. Brown, Zanesville, O.; R. F. Roberts, Randolph, Wis.; F. H. Delker, Henderson, Ky.; A. T. Stevens, St. Louis, Mo.; N. G. Williams, Bellows Falls, Vt.; Francis Farquhar, York, Pa., and F. Lebar, Owatonna, Mich.

Chicago won out by a unanimous vote in the race for the 1914 convention.

GREAT WAGON WEDDING

The Indianapolis Star's South Bend, Ind., special reports that great interest surrounded the uniting of two millionaire families prominent in the industrial world by the marriage in South Bend of Miss Mary Jane Fish, granddaughter of J. M. Studebaker, local millionaire wagon manufacturer, and Gustave Breaux Ballard, son of Mr. and Mrs. Charles Ballard. Mr. Ballard is a flour manufacturer of Louisville, Ky.

Prominent persons from coast to coast were among the 1,000 guests who witnessed the ceremony. Presents valued at more than $500,000 were given the couple. The service was held at the residence of J. M. Studebaker, Sr. Miss Fish wore her mother's wedding gown. The lace veil she wore had been made especially for her mother's wedding in Paris.

193 ACCESSORY MAKERS TO EXHIBIT AT NATIONAL SHOW

Though nearly all of the better known tires and the proud names of their makers will be missing from the forthcoming National shows, due to the action of the "tire group" of the Motor and Accessory Manufacturers, Inc., tire manufacturers, nevertheless, will not be lacking, at least six of those not affiliated with that organization having booked space for the New York show in January next. They are part of the 90 unaffiliated accessory exhibitors to whom space has been allotted by the Automobile Chamber of Commerce. Added to the 103 M. A. M. members who will display, they bring the total number of accessory manufacturers booked for New York to 193.

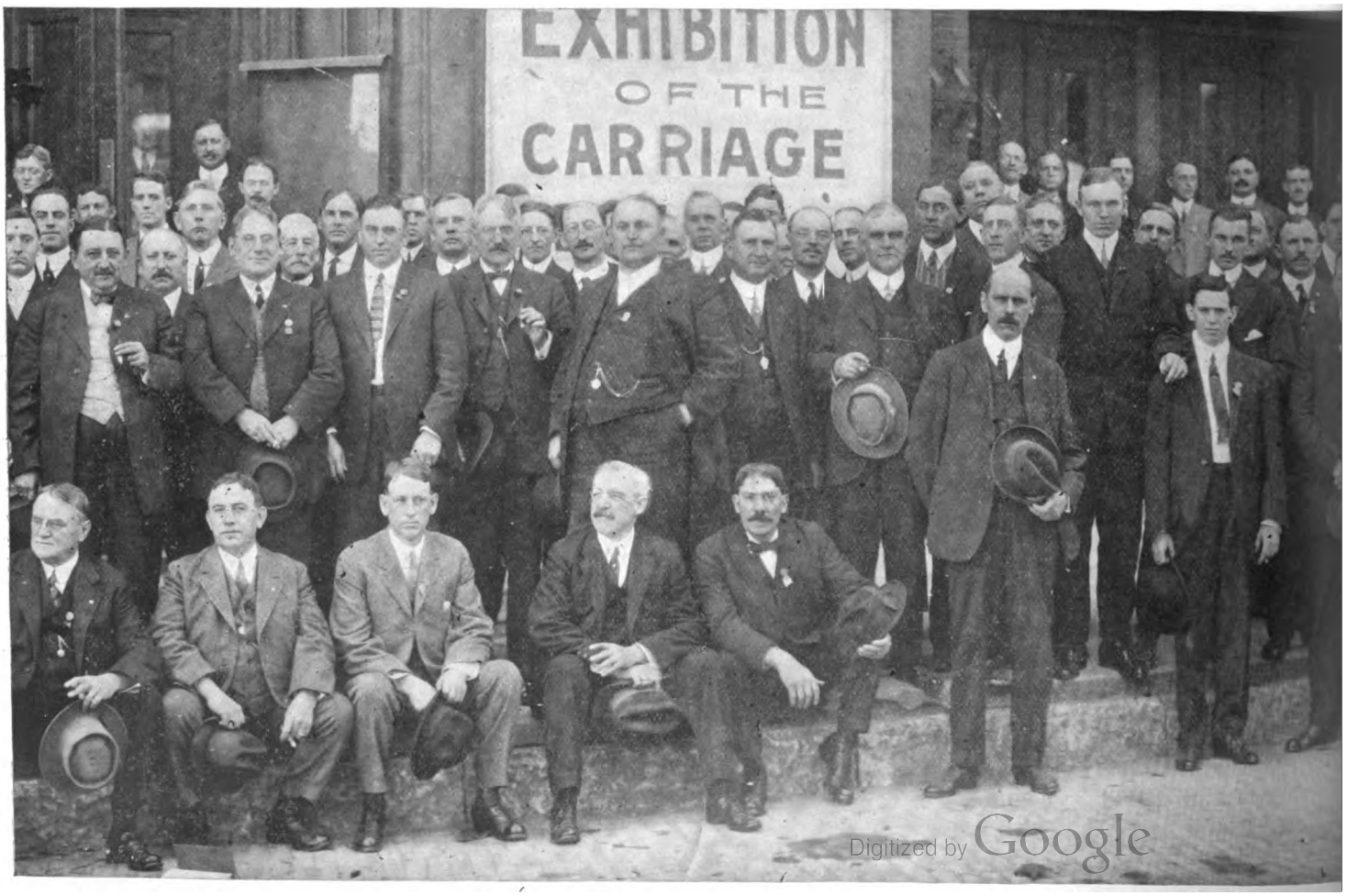
MICHIGAN ASSOCIATION MEETS IN GRAND RAPIDS, NOVEMBER 18, 19 AND 20

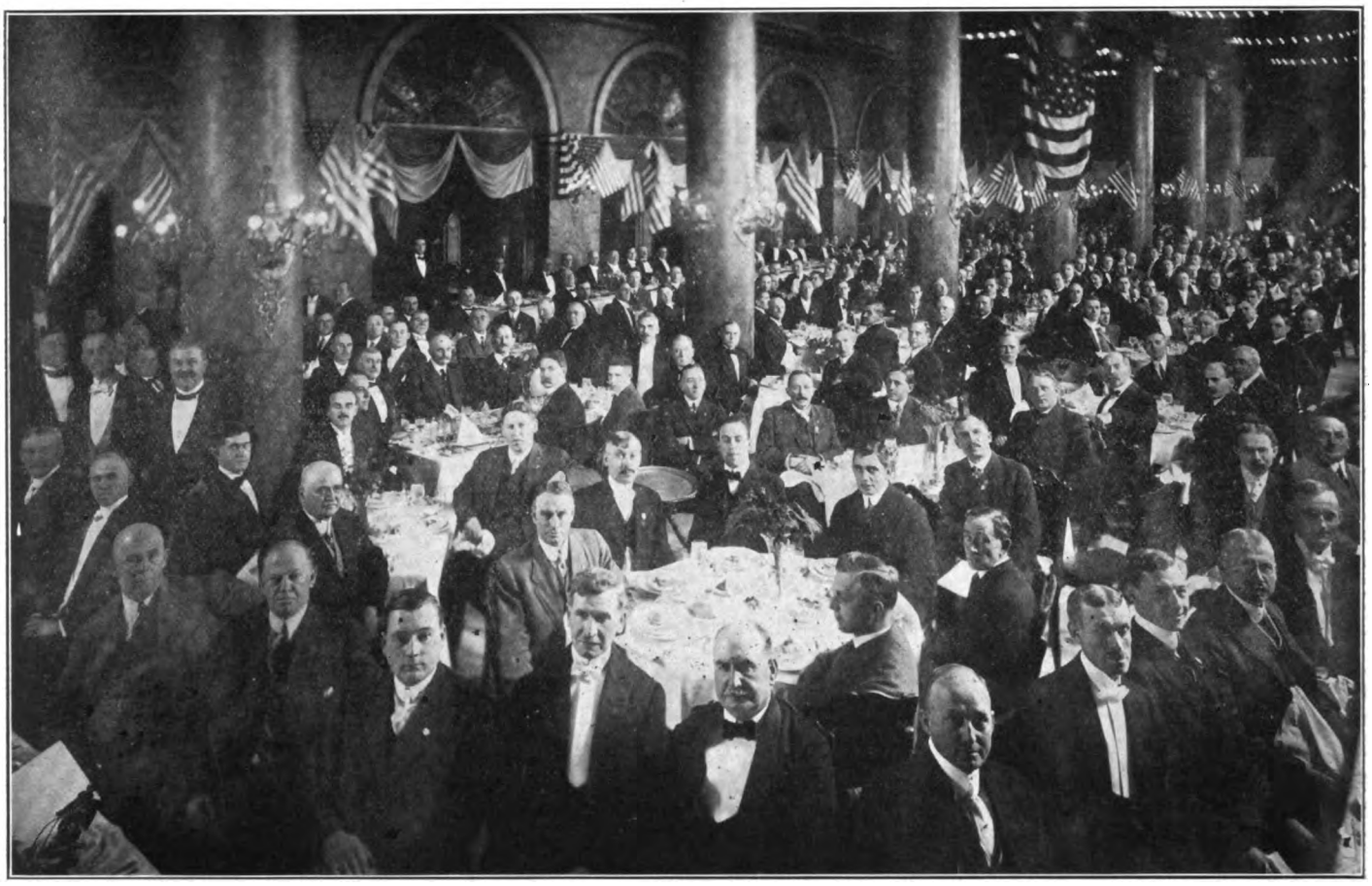
The annual meeting of the Michigan Retail Implement and Vehicle Dealers' Association will be held in Grand Rapids, November 18-20, and Secretary F. M. Witbeck is arranging the preliminaries. The attendance, it is expected, will be between 500 and 800 and among the speakers expected are President J. A. Craig and Secretary E. W. McCullough, of the National Manufacturers' Association.

One of the features of the convention will be the banquet Wednesday evening which will be served in the Furniture Exchange building. George G. Whitworth will be toastmaster.

SHOT BY HIS WIFE

Roy Cheney, a dealer's salesman, living in Hardwick, Vt., was shot by his wife after an altercation, supposed to have been caused by the other woman in the case. The result of the shooting not yet known. Mrs. Cheney under arrest.





Banquet Picture of C. B. N. A. Convention

SECRETARY OF AGRICULTURE HITS NAIL ON HEAD

David F. Houston, Secretary of Agriculture, delivered an address on Federal co-operation in road building before the Good Roads convention. Mr. Houston said in part:

"The suggestion of great national transcontinental roads appeals to my imagination, as does the suggestion of interstate roads connecting capitals or cities of commercial importance to my logical faculty and to the sense of pleasure that I experience in riding about the country in my friends' automobiles. But that the essential thing to be done is the providing of good roads which shall get products from the community farms to the nearest station and make rural life more profitable, comfortable and pleasurable, I entertain no sort of doubt; and it is obvious that the representatives of the people in Congress are like minded. For in making their appropriation they stipulated that it should be used in improving the condition of post roads with a view to the economy and efficiency of postal delivery and for the transportation of farm products to the market. Such roads are equally essential to the establishment and operation of decent elementary and secondary schools for the benefit of the country boys and girls. I do not eliminate other things for consideration and I do not underestimate the rights and pleasures of the automobilists and the service they have rendered in the propaganda for road building."

COMMERCIAL RELATIONS OF THE UNITED STATES

A concise volume, which contains statistics showing the foreign trade of each country of the world during 1911 compared with the previous year, has just been issued by the Bureau of Foreign and Domestic Commerce at Washington This publication shows the principle articles and their value entering into the trade of each country and the itemization of the imports from and exports to the United States. The statistics were prepared by American consular officers, and supplemented by other official data. In addition to trade statistics, the grain crops and mineral output of the principal countries are given, thus presenting in compact form the principal features upon which the commerce and industries of the foreign countries depend. The volume should prove highly valuable for reference purposes, having been revised and brought up to date so far as statistics were available. Copies of the book may be obtained from the Superintendent of Documents, Washington, D. C., for 35 cents each.

FASHIONABLE COLORS

Shades of French grey have been the leading colors for car work, and painters have produced some pleasing combinations with this color. Many of the effects in striping the panels or treating a top belt in another tone to the ground were carried out in perfect harmony in the majority of cases.

These greys had an almost universal popularity for a considerable time, but the vagaries of fashion seem to point strongly toward the brown becoming popular in the future. The browns are simply a revival of colors that were very much in vogue 30 years ago, before the advent of the cheap lakes, and were known as Bismarck brown. As a panel color for large surfaces the browns are much more effective than greys, being warmer, with plenty of life in them and more refined looking. The grey family, after a few months' wear, have a dingy look about them. Once the varnishes loses its gloss there is very little to redeem the job in the color itself.

The St. Louis Convention a Distinct Success

Over Twelve Hundred Registered—Meetings Well Attended—Optimism the Keynote—Atlantic City in 1914

The novice—the man with only the layman's views and knowledge of the carriage business—got from the C. B. N. A. forty-first annual convention two very distinct impressions: All through the crowded meetings and the rush of business during exhibition hours there was continually apparent a strong feeling of optimism—a feeling that the horse-drawn vehicle business after the "blue" times of the past decade, was again on the up grade, was again coming into its own. This feeling was undoubtedly the father of the other which was equally noticeable—that carriage builders were losing their fear of the motor vehicle and that henceforth they would conduct their business less on defensive lines—that the parting of the ways had been reached.

It was a great meeting and the registrations—over 1,200—exceeded those of any previous convention for many years, excepting that of 1911. Space in the exhibition hall was well filled with attractive exhibits and the really live exhibitors reported very satisfactory business.

The business meetings, due to the rule closing the exhibition hall during meeting time, were well attended, in fact the room was packed to its capacity.

The hosts of the convention were the officers and members of the Implement, Vehicle and Hardware Association, and they set a pace that will make the work of future committees exceedingly difficult. Southern hospitality combined with western hustle kept the conventioners doing something every minute. The local committees were as follows:

W. H. RONINGER
President

C. B. N. A. Committees

Convention Committee—W. H. Roninger, chairman; Geo. B. Ogan, George H. Schelp, R. E. Gardner, Jr., H. P. Hubbell, Thompson Price, P. E. Ebrenz, L. A. Geserich, C. N. Waterhouse, Norman B. Champ, J. D. Cathey, J. A. Moroney, E. C. Sullivan.

Advisory Committee—P. E. Ebrenz, W. H. Roninger.

Finance Committee—Geo. M. Hoffman, chairman; P. E. Ebrenz, Geo. H. Schelp, Norman B. Champ, E. L. Galt, W. A. Uhlenhaut.

Entertainment Committee—L. A. Geserich, chairman; Russell E. Gardner, Jr., E. C. Sullivan, H. P. Hubbel, Norman B. Champ, J. A. Moroney.

Reception Committee—Geo. B. Ogan, chairman; Thompson Price, A. T. Stevens, C. N. Waterhouse, J. D. Cathey.

Ladies' Reception Committee—Mrs. P. E. Ebrenz, Mrs. Geo. B. Ogan, Mrs. W. H. Roninger, Mrs. C. R. Crawford, Mrs. J. D. Cathey, Mrs. Harry Hubbell, Mrs. Thompson Price, Mrs. E. C. Sullivan, Mrs. E. L. Roninger, Mrs. H. F. Cartwright, Miss Lulu Champ, Mrs. Geo. M. Hoffman.

The entertainment program included an Arabian Knights reception and dance, Tuesday evening; an automobile ride and luncheon at the Grand Leader for the ladies on Wednesday; a banquet for the men and a theatre party for the ladies on Thursday, and on Friday a vitist to the Anheuser-Busch brewing plant where luncheon was served.

To describe in detail the Tuesday night entertainment would have required the services of at least a dozen reporters—and mighty good ones at that.

There was not only something doing every minute, but several things, each and every separate minute for four merry hours.

The entire parlor floor of the Planters' had been reserved for the occasion; it had been brightened by innumerable lights and beautified by elaborate decorations. A part of the decorative scheme included the fancy costumes of the members of the entertainment committee and the numerous performers.

For entertainment there could be found that which would please every variety of taste and woe betide the man who tried to see it all. It was a midway plaisance, several three ring circuses and a mardi gras all rolled into one, there was a sextette of colored singers, magicians of both sexes, a troupe of juvenile acrobats, a whole bevy or cabarette performers, a bunch of palmists, a small army of vaudevillians, and a corking good orchestra.

Then, of course, there was dancing—tango, turkey and all the rest—and the big eats, enough for a couple of regiments and of quality and variety equal to the entertainment program.

The banquet on Thursday night was another affair to be long

remembered. The service was excellent, the speaking just the right sort and the 400 present voted it a real success. A fact of considerable interest was that this event occurred just 29 years to a day after the famous banquet held at the old Southern Hotel in St. Louis by the C. B. N. A. at which Gen. W. T. Sherman was the principal speaker. There was much discussion during the week as to the exact date of the previous affair, but all doubts were set at rest by A. Wackman, of St. Louis, one of the "old guard" who produced a program of the event showing the date October 16, 1884. Through the kindness of Mr. Wackman we reproduce the program herewith.

THE BUSINESS MEETINGS

SESSION OF TUESDAY, OCTOBER 14

The Coliseum Hall was packed to its capacity when President Charles C. Hull, of Connersville, Ind., rapped for order shortly after 10 o'clock.

After a song by the Metropolitan Trio, President Hull, after a few opening remarks, introduced Mayor Henry W. Kiel, of St. Louis, who, in a speech sparkling with witicisms, welcomed the visitors.

In response Mr. E. M. Galbraith, president of the Anchor Buggy Co., of Cincinnati, said in part: I esteem it a great honor to represent the Carriage Builders' National Association, for this industry has played a vital part in the development of the civilization in which we glory. In the day when the railroad train was a dream of the future, and the steamboat a phantom of the imagination, the Conestoga wagon and the prairie schonner was dragging the paths for the future commerce of the nation.

Carriage building is a man's job. In a peculiar sense carriage building is an assembling industry. Metals from the mines; wood from the forests; leather, cloth and a hundred other things must be brought together, and the iron worker and the wood worker and the tanner and the draughtsman, the upholsterer and the painter must mold them into the finished product. The world is our market, and we are an important link in the economic changes.

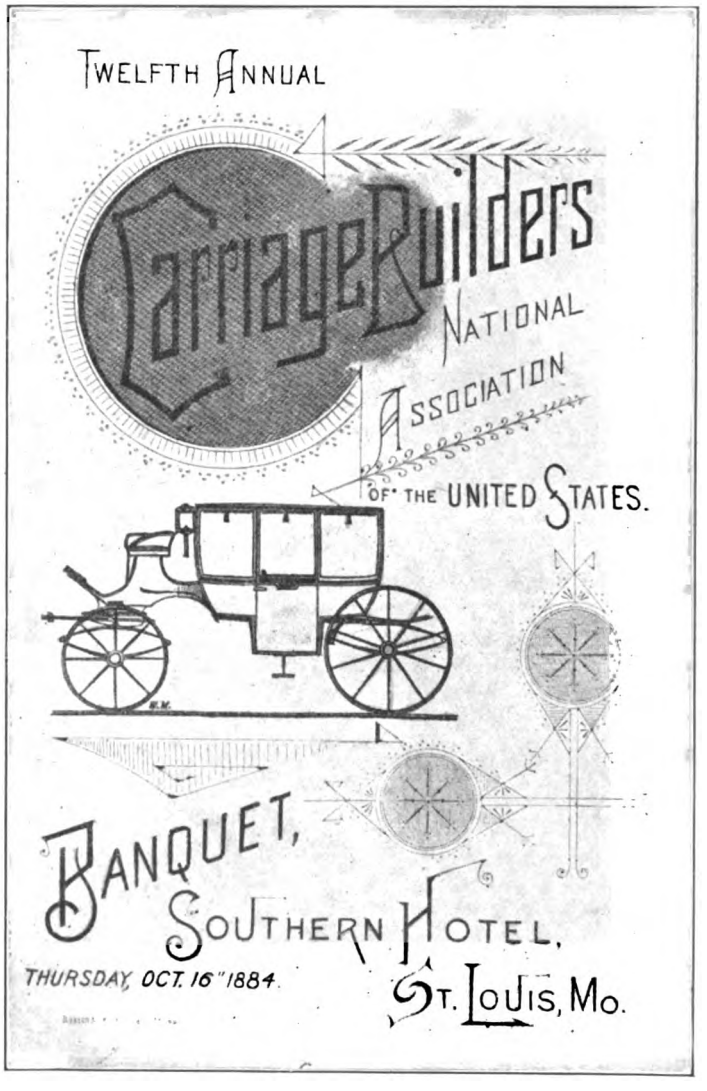
ANNUAL ADDRESS OF PRESIDENT C. C. HULL

This meeting marks the forty-first milestone of our honored association. Many and varied have been the experiences of the association and its membership during these years. The great development in the carriage industry; hundreds of carriage factories were established, many of which developed into large proportions, producing handsome returns upon the investment. Perhaps but few industries during these years grew more rapidly or more substantially. The depression of 1893 was withstood with unusual fortitude by the carriage builders.

Peculiar to our industry is the fact that for many years it had no common competitor. Transportation was alone by railroad, steamship or the product of the carriage builder. The brougham, coupe, or victoria, graced the boulevards and the park drives of our cities, and the buggy and carriage were the pride of the townsman and farmer. The first real disturber of this rare condition was the advent of the bicycle. Some real sturdy carriage manufacturers took fright and conceded they had met their Waterloo. Time proved this to be untrue, and demonstrated that this means of transportation had not arrived too soon. In reality, the use of the bicycle made the use of the horse and buggy more necessary, for the public learned to ride and forgot the art of walking. The "novelty and faddy" days of the bicycle were soon past and it assumed its burden amid the affairs of mankind as a commercial proposition. The inventive genius of some men could see still a greater field in the realm of transportation yet unexplored, so there came, in the early dawn of our present century, the advent of the automobile. The novelty and newness of this means of transportation were inspiring and most attractive, and, as a result, the carriage builder was absorbed in thorough admiration and fear of this new competition. The builders of high grade vehicles were justified in their alarm; their once thriving business is now a sweet memory of the past. But not so with the vehicle of medium price, whose province is to give real service. The manufacturer of a standard utility buggy or carriage, who, during the past four or five years, has conserved ideas, conserved efficiency, conserved up-to-date methods, and has applied enthusiasm and push to his business, is today possessed of a thriving, profitable business.

Evolution of Transportation

Transportation, like all other elements of development, exists in an atmosphere of evolution. It had its beginning in the art of walking, then the beast of burden, the ocean craft, the steamship, the railroad, the carriage and buggy, the electric car, the bicycle, the motor car, and the airship—it takes all of these to meet the world's transportation requirements. Our industry is responsible for a goodly portion of this service, and that less service is not expected of us is evidenced by the fact that 1913 has been one of the best years in the history of the industry. That conditions and environments have changed is but natural. This is true in all lines of activity. We, as an industry, must meet those conditions. I honor this, our National Association, for the service it has rendered the members of the craft during these 41 years, but I believe there is need of a closer co-operative affiliation now between the membership and the executive department of our association than ever before. This is a



First Page of 1884 Menu

period of concerted action. Industrial evils can be eliminated only by co-operative movement. Unity of action is possible when confidence abounds—confidence results from a better knowledge of our fellow craftsman. Our competitor is not half as dangerous a fellow as we think he is, and there is a chance that we may find him more conscientious in his business affairs than we ourselves. The future of the carriage industry, in a great measure, depends upon the conduct of those engaged in the business. A fair and sane policy toward our fellow craftsmen and a "square deal" for our customers, will conserve a prosperous future for our industry.

We are here today under favorable and auspicious conditions. This year has been a prosperous one to the carriage builder and has done much to re-establish confidence in the permanency and stability of our industry. We should stand close together in our National Association work and adopt such policies as will make our association helpful to the membership in the

greatest measure possible. The work in the hands of our several committees has been prosecuted with diligence and success, as will be seen by the reports which they will make during our convention. It affords personal pleasure to recount that during the year there was not a single note of discord in any department of the association work, and I take this opportunity to thank our worthy secretary, the executive committee, and all who have had to do with the association's affairs, for their very kindly co-operation and support.

Mr. Perrin P. Hunter, president of the American Carriage Co., of Cincinnati, O., was then introduced and spoke as follows:

MR. HUNTER QUOTES FIGURES

Last night as our Carriage Makers' Special from Cincinnati rolled this way I could continually hear "41, 41, 41, 41, 41," until I realized that "41" was certainly a very prominent figure today. In talking with those people who make the majority of the parts for the horse-drawn vehicle an estimate has been made recently that in the last twenty years there has been put together, manufactured and sold 41,000,000 horse-drawn vehicles, and it fits this day, as our president said, that this is the forty-first annual meeting of the Carriage Builders' National Association. I see a strange sign on the door, "4-11-44." I can divide that and make it into 41 twice and still have four left. The 11 in there calls to my mind that in the last year or two statistics tell us that there were 11,000,000 more horses and mules in this country than there were two or three years ago. I am also reminded that the harness men of the United States for the last fifteen months have been very busy—more busy than usual, looking for an extension of their business. If we have that increased number of horses and mules, and the harness men have had that increase in the last fifteen months, does it not stand to reason that the vehicle business for the coming twelve or fifteen months will show a wonderful improvement?

Our southern land this year has made marked improvement by diversifying its crops. It has drifted away from cotton. It has a country which is getting as good as the north. They have raised more oats, they have raised more wheat. I am told that the production of cotton will exceed 15,000,000,000 bales, which means that those eight or nine southern states will have for themselves practically in gold a sum between $800,000,000 and $900,000,000. Taking it for granted that 60 per cent. of the cotton goes abroad, there is $500,000,000 to $600,000,000 of new gold that comes back to the southland. The southern manufacturers are busy at this time. They are expecting to do better even after the clearing up of this crop for a start of a new year. The metal spring manufacturers tell us that more than 1,300,000 horse-drawn vehicles were made and sold this year. That is certainly encouraging.

The general farm products of the country all over are good notwithstanding the fact that the government claims that we possibly will be one billion short in the total crop. Going back to 1906 and 1907 this country claimed farm products to the extent of four and a half billion. Every year since that time it has increased one million, until last year it is claimed to have nine billion, five hundred million, and if we have only lopped off one-sixth or one-seventh this year, we are still in a position to expect a wonderful business in the vehicle and harness line.

The people who have for the past hundred years put their love and their pride on a good-looking buggy and harness and horses, may have for a time been inteersted in the novelty that uses gasoline; we have use now from a government standpoint for the airship, but, gentlemen, as long as we live, as our president has said, if we give them a square deal you may look for a steady improvement in the horse-drawn vehicle industry. I thank you.

MENU

OYSTERS.
Blue Point on Shell.

POTAGE.
Mock Turtle a'l Anglaise.

POISSON.
Boiled Kennebec Salmon, Sauce Hollandaise.
Potato Croquettes. Sliced Cucumbers.

RELEVE.
Saddle of Lamb ala Macedoine.
Tomatoes Braise.

ENTREES.
Tenderloin of Beef, ique ala Duchese.
String Beans.
Sweet Bread in Cases ala Reine Margot.
French Peas.

SORBET.
Punch au Kirsch

ROTI.
Breast of Teal Duck, English Bread Sauce.
Lettuce Salad.

DESSERT.
Napolitaine Ice Cream. Assorted Fancy Cake.
Fruit. Cheese.

CAFE NOIR.

PROGRAMME

GRACE, REV. GEO. P. WILSON, D. D.

1. THE CITY OF ST. LOUIS.
Hon. George W. Parker.

2. THE STATE OF MISSOURI.
Gov. E. O. Stanard.

3. OUR COUNTRY.
Gen. W. T. Sherman.

4. THE CARRIAGE BUILDERS OF THE U. S.
G. H. BURROWS.

5. THE PRESS.
John A. Dillon.

6. THE PROGRESS OF AMERICAN INVENTIONS.
Wm. M. Eccles.

7. THE WEST.
Gov. Noman J. Colman.

8. OUR ASSOCIATE TRADES.
Wm. N. Fitzgerald.

Reproduction of program of the banquet held by the C. B. N. A. in 1884 at which Gen. Sherman was the principal speaker

President Hull then presented Mr. C. S. Walker, of Des Moines, Ia., who said, in part:

THE CARRIAGE COMING BACK

I was in a small village in Iowa the other day. The dealer whom I was calling on had sold 29 vehicles—it was in May—up to that period, and he said to me that there was not a single automobile in that township. That was certainly refreshing. We are inclined to get scared when we are in centers of popualtion such as this, when we see the great number of those wagons on every hand today; but I think we are alarmed too easily. The automobile is here to stay, certainly, but so also is the carriage industry. We are going to stay with the game awhile, and we who have stayed by the game have all the more reason to be thankful for it. Some of our good brothers have followed after strange gods and dropped their wads and want to get back in the ranks; some of those who wandered off have succeeded.

I have been asked to say a word as to the carriage business in the central west, and I can not answer that without quoting some figures. Figures are great things, gentlemen. It is only by figures we can tell how we are going to do within the next twelve months, and being more familiar with Iowa I am going to use some figures that are based on Iowa conditions. After you hear the figures you will all want to move your plants out our way and get some of this prosperity. In Iowa there is an automobile for every 60 inhabitants. When I first heard that it nearly knocked me off my feet, because I thought if that was true there certainly was not much chance for us boys; but I decided to do a little figuring myself, as I have gotten a few, and I find that in Iowa there are 217,000 farms, leaving out the odd numbers; I have calculated the population as 2,250,000, and I discovered by a little method of short figuring that there is a carriage or a spring wagon or a top buggy for every three and a half persons living within the state. Now if we can go on as we are going the carriage industry throughout the central west is going to grow, and it is going to grow because of this little bunch of figures: For example, in 1912 we raised in our little state 432,000,000 bushels of corn and we got for it a little over $151,000,000. This year we have raised a little less in bushels, 330,000,000 in round figures, but we have gotten $198,000,000 for it; so you see that we are still in position to buy buggies. We have got more oats, more cattle, more hogs, more horses, and taking the entire totals we have got an increase over last year, which was said to be one of the best we ever had in our section; we have an increase of almost $100,000,000 over and above the best figures that we have ever been able to show before; that is this year's—this year when we are having crop failures; this year when everybody said the country was going to the bow-wows. The central west is the market for your products.

There are indications that the horse-drawn vehicle is coming back. The increase in the number of surreys, the increase in numbers of four and five-passenger vehicles, leads us to believe that such is the case.

There is only one more thing, and our good president has touched upon it, that I would like to see, and that is to see this organization grow bigger and grow stronger, and really come to amount to a good deal in this land of ours. A man told me in the hall out yonder this morning that the carriage trade was the poorest organized of any trade in the United States. I am very sorry if that is true—I am not prepared to say that it is true, but I do know that this organization can do a great deal more, we can accomplish more, if we will get together in the spirit which we ought to get together in, and I hope that is one of the things that we may accomplish at this meeting.

President Hull: We will now hear from a man who is in a position to know more about the trend of the carriage industry perhaps than any other man, because he is in touch with the parts that we must use if we build buggies, Mr. O. B. Bannister, of Muncie, Ind. Mr. Bannister said:

BANNISTER URGES CONCENTRATION

So much has been said about automobiles that I think I will let it go with this little story and we will say nothing more about the automobile: Away back in olden times when I worked at a factory in Sandusky, O., we had a foreman who was a little bit illiterate. He had the right kind of matter "upstairs," and he argued with the boys about their striking. He brought them all up before him and said: "Now, you that am for us come on this side and you that amn't go outside." Now, you that am for the buggy business take hold of it and push it if you mean to make a living out of it; and you that "amn't," go into the automobile business. There have been made in the United States in the first six months of this year one buggy for every 200 people in the United States, assuming that there are 100,000,000 people in the United States. There will be made, according to the best data that we can secure, one and a quarter buggies for every 100 people in the United States this year, and according to the statistics of your Statistics Committee it is the best year that you have had in the buggy business for eight years. There is possibly involved in this business $75,000,000, making close to $100,000,000 of products. Is there anything that you could do that is a better line of business than that? Why, sure not.

Mr. W. H. McCurdy, of Evansville, Ind., was then introduced and addressed the meeting on the subject of

THE CARRIAGE INDUSTRY

The one thing uppermost in the minds of business men today, either manufacturers or merchants, is "What Will the 1914 Harvest Be?"

Wherever there is profit there is pleasure, and it gives me pleasure to attend the meeting of the Carriage Builders' National Association. Not only in meeting of members of the craft, but the knowledge that I am to be profited by an interchange of views. It is instructive and really inspiring to have an opportunity to exchange business views and to see the future from the viewpoint of other men.

I am sure I am not alone when I say I have always been able to carry away with me from our annual meeting something of value.

I am asked today to make a little talk on the carriage industry from the standpoint of my own observation.

It is not expected that men will look very far into the future and I am of the opinion that wisdom in prophesying is the result of a careful analysis of the past. Our industry has passed through seasons of prosperity; we have also lived through disappointing years. The past three years, I may say, have been anything but inspiring to the average carriage manufacturer.

There is an old saying that "water will seek its level," and I am one who is strong in the belief that the carriage manufacturer will again come into his own.

The past year covers a period that more than one of us, in the beginning, concluded to hold up as a criterion for future movements, and if we look at the field in a broad sense, taking into account the discouragements that have visted the dealers in horse-drawn vehicles during the past three years, also taking into account the attitude of the dealer today, we have reason, and good reason, to feel greatly encouraged.

More Noise Wanted

It has been my opinion during the last three years, and I have so stated, that the carriage manufacturer should make a little more noise; should make enough noise to attract the attention of the dealer and that this might best be done through some methods of advertising that have not been generally employed during the past three years. I am not, at this time, going to make any special recommendations along the methods that I think should be employed. I believe there is a movement on foot pointing to plans that might be worked out. I will say, however, that whatever plan, if any, is adopted, it should be for the express purpose of convincing the present dealer and men who have discontinued handling buggies, that the buggy manufacturer is alive; that we know the people of the country are yet using horse-drawn vehicles and that if they will carry a sufficient line on their floors and adopt the same measures that have been adopted in former years, the business that has slipped away from them will gradually come back.

I believe that with the proper effort we can again raise our industry up to the highest point in volume that we have ever reached.

It is a self-evident fact that the farmer who can't afford more expensive means of travel will be compelled to continue riding in the buggy and surrey. There is another fact that can't be refuted and that is the farmer who can afford other means of transportation than those of horse-drawn vehicles will also keep on hand buggies, surries and runabouts for certain seasons of the year. This, it seems to me, is a fact undisputed, as the farmers have the horses and the price of a buggy is today so low and the product of the farmer is priced so high, that they can well afford their buggy and will continue to use them if the dealer will keep them on hand and display them for the purpose of sale.

I have, as is my custom, made a careful canvass of conditions in the different states and while there are good reasons for complaint in some localities, there are abundant reasons for rejoicing in others, and in striking a general balance, I see nothing to discourage us in business in the near future, and, candidly, I anticipate a normal business for 1914 and feel quite confident that the buggy industry will be equal to that of 1913, and I think all who made a reasonable effort to secure

trade will agree that the general volume has been very encouraging.

I am firm in the belief that the building of horse-drawn vehicles is a more staple industry today than it has been at any former period. It has in the past five years withstood the test of a fierce and bitter fight.

Buggies, surreys and spring wagons are still on the road and out for an increase in volume by reason of the tremendous "back-to-the-farm" movement. The government is from time to time throwing open to the public homestead land; large land owners are cutting tracts for the small farmers, and the increase in our farm population is making itself felt among the implement and vehicle manufacturers.

One man, well informed, coming in from Texas recently, made the statement that a 20 per cent. short crop was not felt much in that state as it was largely overcome by the increase in new farmers coming into the state which increases the acreage under cultivation.

The president announced that the next order of business would be the nomination of a president for the ensuing year.

Mr. P. E. Ebrenz, of the John Deere Plow Co., of St. Louis, in a brief to-the-point speech nominated Mr. W. H. Roninger, of St. Louis, as president for the ensuing year.

President Hull then appointed the following committees:

Committee on Resolutions—Homer McDaniel, C. S. Walker, H. S. Scherer.

Committee to Recommend Officers for the Ensuing Year—W. A. Sayers, W. H. McCurdy, W. E. Maxwell, Frank H. Delker, C. A. Lancaster.

Obituary Committee—A. M. Ware, Chas. M. Peters, Geo. R. Carter.

Committee on Exhibition—W. A. Notman, A. R. Friedmann, E. L. Roninger.

The session then adjourned to 10 o'clock a. m. Wednesday.

WEDNESDAY SESSION

The meeting was called to order at 10 o'clock by President Hull, the program being opened by a song by the Metropolitan Trio, followed by Fritzotte, the yodler.

President Hull announced that Mr. Russell E. Gardner, president of the Banner Buggy Co., was unable to attend the convention owing to the serious illness of his father, and introduced as the speaker in place of Mr. Gardner, the sales manager of the Banner Buggy Co., Mr. Hugh J. Cartwright, who delivered the following address:

SENTIMENT IN BUSINESS

The subject assigned to me, in my opinion, is of such scope as to practically cover every business transaction—"Sentiment in Business." It's a subject I believe that is not only in the majority of cases misunderstood, but the most abused subject before us today.

Sentiment is something that is given to us by nature—that is expressed in every thought and move we make. I believe, however, that sentiment in connection with business is a matter of thought and emotion, but that thought governs the emotion in its application.

Only a few years ago it was necessary, in securing business among industrial people, for large amounts to be expended in entertainment. We were compelled, first, to show the other fellow that we were a "good fellow" and afterwards tell him in regard to our values and prices.

We found there were institutions that practically existed on this basis and most of their business was transacted through this class of sentiment, created in coming in contact with their trade. But, as competition becomes keener and keener, we find this interpretation of sentiment to be less and less practical.

It is this class of sentiment created that I believe to be impractical, for it is my opinion that we are putting it on the right basis in showing a customer the usual business courtesy—entertaining at dinner, theatre, or in other similar ways—to make this customer feel that we are doing it not to buy his business, but from the heart; because we feel this way personally towards him and not for actual commercial gain, but absolutely feel personally interested in him, or otherwise it is not money well spent. It is not lasting; we have created a customer on the wrong basis; we have misled him; taken advantage of his sentiment; not looked after his interest.

The individual or institution today who is remembered and makes headway in the business world is the man that creates sentiment through his action—his square dealing—for this is what we all appreciate and would gain for us more friends and create more good fellowship than doing tenfold more in an insincere way.

Friends Made by Square Dealing

When you make a friend in a business way through thought and square dealing, it's a friend that lasts, for while you may like the taste of champagne as well as this friend, you can rest assured that the substantial feeling of good fellowship doesn't exist between you on account of similar tastes, but for other reasons that are worth while.

It is so often the case that you find an institution that believes its business and its success lie absolutely through some secretive channel created by themselves.

This is temperament, not sentiment. This institution, whether a large one or a small one, is daily losing ground. They are unduly sentimental towards themselves and are lacking the usual degree of good fellowship in gaining the advantage of an exchange of ideas and are conducting their business along narrow channels.

There is nothing secretive about a business. If you are successful it is the result of following out certain well-laid plans—exercising good business judgment. If you are right in the formulating of your plans and right in your goods and prices, you can only gain in the exchange of ideas, in being a good fellow, in allowing sentiment in its right sense to permeate your business.

I don't wish to be understood that I believe sentiment can wholly be interpreted in business as a matter of thought. In the transaction of your business—following out the principles of success, in placing it on a thought basis, figuring basis, in figuring each item over from every standpoint—it is necessary that you carry out the highest degree of fair treatment, the highest degree of honesty, the highest degree of principle in dealing, and the man or the institution that can do this has in their system the highest degree of sentiment, for all mankind admires honest, straightforward dealing, creates friends in this way, and, in fact, creates for himself and feels toward others the degree of sentiment that makes business successful, and the same degree of sentiment that you will find the world over in people who do things.

The same principles in every institution will be found on the inside as well as on the outside. Human nature is the same, no matter in what position we might meet it.

In every factory and every institution you will find that the atittude of the employes is governed by the same principle, or sentiment, as that which creates a standing for the institution with its trade.

You will find that every employe appreciates straight-from-the-shoulder dealing, desires to be on a matter-of-fact basis, and in the course of time the association of the employes with an institution is on a lasting basis.

Too often sentiment and selfishness are closely related—as selfishness often creates sentiment for those that we can use—and we often find in our midst thost that desire only a personal advantage or are not interested.

This Is Not Sentiment—It Is Greed

You will often find in some customer you have never known personally, have never seen and who has never seen you, come in personal contact with you, whose connection and association with your institution is governed by the quality of your goods, your prices, your treatment of him in general, the highest degree of sentiment exists, that he feels kindly toward you personally, especially interested in you and your welfare, not because he has bought your goods and is more than pleased with them, but due wholly to his admiration of the right thing, the right treatment and the character that he knows must exist in the carrying out of these well-laid plans.

We are told by the advertising agencies that one of the best mediums of advertising is through that of throwing personality into your business, of throwing individualtiy into it, of bringing out forcibly the personality of this particular individual, for today, if Mr. Henry Ford carried out his obligations to the public in doing personally the many tasks set for him that he never dreamed of, it would be necessary that he become a Methuselah in age.

If sentiment of this nature is worth while, of value to an institution, first the goods sold by the institution must be of such quality and character as to undergo the severest criticism; secondly, the man must be of such character as to fulfill the standards set for him in the minds of the people through this publicity.

The right kind of sentiment stands for sincerity, honesty, fair dealing and stability, and is the backbone of every institution, will live forever, will permeate and stand as an asset to either an individual or an institution, and the only kind of sentiment worth while.

President Hull then announced that Mr. H. P. Bope, the first vice-president and general manager of the Carnegie Steel Co., of Pittsburgh, Pa., was unable to be present owing to illness and that his address would be read by the general sales manager of the Carnegie Steel Co., Mr. Wm. G. Clyde:

THE FUTURE OF STEEL

On the subject, "The Future of Steel," Mr. Clyde said that the world had only come to know the real value of steel in promoting progress within the last half century. The discovery of Bessemer gave the needed impetus to the industry.

Mr. Clyde spoke of the development of the steel rail business. The introduction of steel frames in buildings, the construction of steel cars, and the period and consolidations brought about by the tremendous demand which found steel makers with their comparatively small plants unable to meet the requirements.

These consolidations, Mr. Clyde said, stood for more stable markets, since drastic competition was no longer desirable in view of the great interests involved, and produced a better condition for both buyer and seller. Competition has by no means been stifled, but has been conducted on a higher plane, due regard being given to the interests of competitor and client alike. It may safely be said in regard to the great steel industry, and I believe it to be no exception, that the relations all through the industry, of buyer to seller and of producer to competitor, are on a basis of honesty, integrity and fair dealing to an extent greater than in any previous history of the business. Coupled with the great increase in production, due to the causes recited, were the comparatively as great increases in demand in other lines. The extension of telegraph and telephone lines called for more wire. The increase in railroads and extension of farm lands called for the wire fence. The canning industry produced a call for tin plate. The car industry called for a larger production of sheets. Steel barrels, steel piling, the solid steel wheel, the steel tie, as yet in its swadling clothes, the substitution of steel for wood in many lines, have all added to production, until now the country, based on the production of the first six months of the present year, is on a 34,000,000 ton pig iron production and close to 30,000,000 tons of finished steel, in all the varied lines in which the article is now used. The wonder of this achievement can best be understood in a comparison of ore shipments from the northwest. The first consignment in 1852 amounted to 4,000 tons. In the year 1913 it is estimated that 56,000,000 tons will be brought down, and while this amount may not quite be reached, the figures show the requirements, and the end is not yet.

The steel industry is but little past its infancy, however lusty the youngster may be. The world, and especially our own country, is growing in population and each additional increase means steel consumption. It is a trite saying now that every man, woman and child in the republic consumes at the rate of 700 pounds of pig iron annually. That amount has been steadily increasing and it is fair to assume that even if the amount per capita does not increase, the continual demand for steel in both standard and new uses will keep the requirements no less and the actual production will increase with the growth of population.

Ever since railroads have found the value of steel in their operations, they hold the key to much of the future situaiton and that future is clouded by their inability to obtain needed finances to continue development, but even more for maintenance of present organization and equipment. In the ten years between June 30, 1902, and June 30, 1912, the total trackage in miles increased 31 per cent.; the number of locomotives 48 per cent.; the number of freight cars 42 per cent., and the number of passenger cars 37 per cent. The total revenue increased 63 per cent., but total operating expenses increased 76 per cent. The net operating revenue, excluding taxes, increased 42 per cent., but taxes increased 107 per cent. Wages paid to employes increased 87 per cent. These figures tell the story and account for much of the reason why a considerable amount of stocks and bonds pay no interest or dividends.

Continually, new uses for steel are being discovered, while its substitution for other materials adds to the production. Little items appear insignificant, yet add to the total. Thirty thousand tons of tin plate are required in the manufacture of tops for beer and white rock bottles. Something over 4,000 tons of sheets are required in the manufacture of eyelets and hoops for shoes in New England. Reinforced concrete construction has grown to a point where fully 500,000 tons of bars are employed annually, and so we might go on listing items in which steel is used to the point of wearying you.

President Hull then introduced Mr. George R. James, president of the James & Graham Wagon Co., of Memphis, Tenn., and who has been president of the National Wagon Association for the past twenty years. Mr. James' address is printed in full in another part of this issue.

ELECTION OF PRESIDENT

On motion, the association proceeded to election of president for the ensuing year.

Mr. Luth moved that Secretary McLear cast the ballot of the association for W. H. Roninger, of St. Louis, who had previously been nominated for that office. The motion was put and carried and Secretary McLear cast the ballot, and Mr. Roninger was declared elected president of the association.

President Hull appointed Messrs. Lancaster and Luth to escort Mr. Roninger to the plantform.

Mr. Roninger said: Mr. President and friends, I am not going to make a speech. I could not make one if I tried. I want to thank you one and all for the confidence you have in me. I am going to try and make good, the same as my predecessors have, and the only way I can make good is to have all of you attend the meetings as you have done yesterday and today. As I said yesterday, these are the grandest meetings we have ever had. Every one seems to take a great interest, and we are going uphill again. We stood still for a little while, but the last two years we have been gradually going up, and we want to keep on climbing until we get to the top. I want the accessories trade to get all the manufacturers of carriages throughout the United States to join this association. We want to meet them and have a good time, and this is the place to have a good time.

REPORT OF COMMITTEE TO RECOMMEND OFFICERS

The following members were recommended as officers for the ensuing year by the committee appointed for that purpose:

Vice-presidents—E. M. Galbraith, Cincinnati, O., first vice-president; Edwin W. Kearney, New York; S. P. Nichols, Jackson, Ga.; S. G. Gay, Ottawa, Ill.; Chas. G. Bosher, Richmond, Va.; Louis Schneller, Milwaukee, Wis.; William A. Hunter, Terre Haute, Ind.; C. S. Walker, Des Moines, Ia.; F. A. Ames, Owensboro, Ky.; J. O. Schwartz, New Orleans, La.; D. P. Hale, Anniston, Ala.; L. F. Weaver, San Francisco, Cal.; Thomas Clark, Amesbury, Mass.; H. A. Crawford, Kalamazoo, Mich.; Geo. H. Schelp, St. Louis, Mo.; John E. Hayford, Newtown, N. H.; John H. Mount, Redbank, N. J.; George Hackney, Washington, N. C.; R. S. McLaughlin, Oshawa, Ontario; Edwin S. Ziegler, York, Pa.; J. W. Anderson, Rockill, S. C., second vice-president.

Members of the Executive Committee—John W. Fulreader, Rochester, N. Y.; Thomas M. Sechler, Moline, Ill.; Theo. Luth, Cincinnati, O.; P. E. Ebrenz, St. Louis, Mo.

Members of the Board of Trustees of the Technical School—Wm. W. Ogden, Newark, N. J., term, five years; Henry C. McLear, secretary and treasurer.

REPORT OF THE EXECUTIVE COMMITTEE

In presenting the customary report of the opening of this the forty-first annual meeting of your association your committee wishes to congratulate you on the improved condition of your industry.

While this has not been so apparent in some sections as in others, on the whole we are confident that there has been a very marked and satisfactory improvement.

Although business in some sections has not been up to the expectations of the manufacturers, in others, we have been informed, it has far exceeded these, and in some sections the best trade of years has resulted, and the number of vehicles made and sold will compare favorably and equal in every way to the best years on record.

Your committee again, as it has so often done, would recommend conservation in manufacturing—not to overcrowd the market—study the prices and make every effort to secure for yourself and the trade a price sufficient to cover the cost of production and an honest profit.

Considering the advanced prices in material used in your production, the finished vehicle is sold far too low-priced, and every effort should be made to secure an increase in the selling price as is justified on the extra costs you are compelled to pay.

The Question of Costs

The vital question of cost of production should be studied more carefully than ever before, and some uniform system in figuring costs and selling prices among our manufacturers would be of great benefit to the whole industry. Our attention has been called to the very successful work of other associations in getting the cost of production, and to follow their example would be beneficial to us all, especially so to those who manufacture along the same line.

The advanced cost in manufacturing vehicles should not cut into the small profit the manufacturer has been getting for his production, and by laying these facts before his customers should aid greatly in securing the consideration of these matters that must finally obtain proper results.

On this day, after 41 years of existence, we feel that we should be proud of the association for its long years of good work and its success in having the trade brought together to renew old friendships, make new friends, consult together and to compare notes and experiences, and in this way improve our calling and renew our interests and work even more faithfully for the good of the whole trade. The improvement and betterment of one is the improvement of all.

Your technical school is in a very prosperous condition and doing great good all the time, and never more so than at present.

All the other committees have done good work, as will be shown by their reports, and financially the association was never in better condition.

In closing, we wish to call your attention to the Reference Book issued by the association on September 1 of this year. It is a work that will benefit all our members, and if properly consulted save money for them, and be of use in many ways.

Respectfully submitted,
EXECUTIVE COMMITTEE.

The session then adjourned to meet Thursday morning at 10 o'clock.

THURSDAY SESSION

The meeting was called to order by President Hull at 10 a. m., and the matter of annual reports was at once taken up.

REPORT OF STATISTICAL COMMITTEE OF THE CARRIAGE BUILDERS' NATIONAL ASSOCIATION

As a rule, industrial statistics are dry and uninteresting, but the study of them by one who is interested in the industry is either inspiring or depressing, as the facts may show cause, for inspiration or depression.

Your committee, through the mediums that have been available to it, are able to present herewith a statement showing approximately the number of sets of wheels, number of shafts and poles, and number of sets of axles, used each year since 1905. It is fair to assume that these figures, secured from distinctly different sources, will be the number of horse-drawn vehicles (spring work) made each year since 1905 as nearly as it is possible to get them without an actual count of the vehicles made, which could be secured only from the vehicle manufacturers themselves, which is practically impossible.

Statement

Showing number of sets of wheels, number of shafts and poles, number of sets of axles, produced since January, 1905:

	Wheel Sets Production January to January	Poles and Shafts Jobs Production August to August	Axles Jobs Production September to September
1905	1,216,224	1,310,000	1,345,268
1906	1,292,874	1,540,000	1,463,331
1907	1,202,559	1,340,000	1,517,634
1908	812,501	1,040,000	946,493
1909	1,115,925	1,062,500	1,185,286
1910	1,201,105	1,325,000	1,349,782
1911	1,097,308	1,075,000	1,344,820
1912	963,305	1,025,000	1,141,484
1913	*620,462	1,127,500	.....

*January, 1913, to July, 1913.

It is unfortunate that the Carriage Builders' National Association did not start a bureau of statistics as to production early in its existence and continue it up to the present time. It would have been very valuable.

The figures presented herewith would indicate that there was made an average of a million to one and a quarter million vehicles each year for eight years prior to January 1, 1913, and the figures showing the number of sets of wheels produced in

A FEW OF THE FAIR SEX WHO HELPED TO MAKE THE ST. LOUIS CONVENTION A SUCCESS

the first six months, and the number of poles and shafts furnished from August, 1912, to August, 1913, would indicate that the production of vehicles during this calendar year of 1913 would exceed 1,200,000, a larger number than has been secured since 1906.

These figures should certainly inspire confidence in the present and future of the buggy business. Not to exceed 5 per cent. of the wheels furnished have been used on express and truck work. Fully 95 per cent. have been for buggies, surreys and light delivery wagons, using axles 1⅛ inch and less. It is fair to assume that the selling price of these vehicles will average $50 per job at wholesale prices. Some manufacturers report a less average, but many report a greater. If this average price is correct, the product of vehicles for 1913 will be sold for more than $60,000,000.

The committee has compiled a list of all the manufacturers of vehicles in the United States, showing an investment of their business of $5,000 and more. This list shows a total minimum investment in the assembling and manufacturing of buggies and light spring wagon work, $35,049,000. The investment in manufacturing establishments making accessories exclusively for the vehicle is probably as much more.

An industry, therefore, in which there is invested some $50,000,000, producing more than $60,000,000, is certainly worthy of the most enthusiastic and exclusive attention of the men engaged in it.

Respectfully submitted,
O. B. BANNISTER, Chairman.

REPORT OF TRUSTEES OF THE TECHNICAL SCHOOL

(Read by Secretary McLear in the absence of the chairman.)

I herewith present my report of the Technical School for the year which closed yesterday.

The day and evening classes opened for the season on September 24 and 25, 1912, respectively, in the school rooms in the Mechanics' Institute at 20 West 44th St., New York City.

There were ten students in the day class and 46 in the evening class.

The day students came from the following named states: Michigan furnished two students; Ohio, two; Massachusetts, one; Canada, one; New Zealand, one; New York City, three. Six of these men were body makers. One was a machine wood worker. One a blacksmith and two were draftsmen. Their ages varied from 18 years to 38 years, and averaged nearly 27 years. The attendance in the day class was 99½ per cent. for the season.

The greater part of the students in the evening class were residents of Greater New York, but some had come from a distance and obtained employment here during the day in order to attend the school in the evening. The different trades connected with vehicle building were well represented, there being among the students 18 body makers, four blacksmiths, six general woodworkers, two machinists, six draftsmen, six office men, one foreman and three superintendents. They varied in age from 17 years to 35 years and averaged nearly 24 years. The attendance for the season in the evening class was 84½ per cent.

The day and evening classes closed for the season on April 9, 1913.

There were eleven graduates, seven from the day class and four from the evening class, and their names follow: George Barron, Julius Chordas, George H. Dunkley, Arthur P. Fletcher, Elmer G. Griese, Joseph L. Hardy, Edward J. Luce, Charles A. Gerry, Louis Hertzog, Joseph Stolfi, William Whitby. The average age of these men is nearly 27 years.

The correspondence department of the school is open for business the year round, and the following report is for the work done from September 1, 1912, to September 1, 1913:

New students enrolled	30
Number of drawings received	1,066
Number of letters received	1,219
Number of letters sent	1,250
Number of examination papers filled out by students and sent to the instructor	157
Number of rating cards filled up by the instructor and mailed to students	1,223

It must be understood that these cards are made out after a careful examination by the instructor, of the drawings and examination papers received by him, and they therefore mean more than at once appears to the casual reader of this report. There are also numerous drawings and sketches made by the instructor in the course of the work, to make plain some point to the pupil. These things can not be properly classified in a report, but they add materially to the work of instruction.

The men in this department of the school work during the day at their various occupations and study during the evenings to fit themselves better to do their work, thus making them more valuable to their employers. This department does its work quietly, and is scarcely heard from except in these yearly reports, but the work is none the less important on that account, and many of the men who started to study in this way a few years ago are now heads of departments in the largest vehicle building plants. The studies in this department are being constantly revised and added to in order to make them as valuable as possible to our trade in its changing conditions.

All three departments of the school have done well this year. There has never been a year since this school opened when so much good work was done. This is saying much, because there have been exhibitions in former years where much worthy work was shown, but nothing equal to what might have been seen at the exhibition in April of this year, and which, I am not afraid to say, was equal if not superior to any work ever shown by a school of this kind. We expect to do better this coming year, however; but as this is a report and not a prophecy this subject will not be mentioned further.

As I stated last year in my report more young men ought to take advantage of the opportunities offered by our day school. The evening school is usually filled. I feel certain that if the school were known more widely in the trade, more men would attend the day school. We ought to have 20 instead of ten students in the daytime. All instruction in the day and evening classes is absolutely free to students, and in a building where the sanitary conditions are thoroughly up-to-date, and where the facilities for doing full-size designing and drawing are unequalled by any other school of this kind. This is important, as the ability to make full-size drawings is the final test of the ability of a draftsman, and of his usefulness to his employer.

During the past year the usual practice was continued of taking the class to visit prominent factories where vehicles and vehicle accessories are manufactured. The places visited this year were the plants of Messrs. Quimby & Co. and Messrs. Phineas Jones & Co., where the greatest courtesy was shown us, and the processes explained by the proprietors who piloted the party through the works.

Before closing this report I wish to thank the Board of Trustees of the School for their kindly help and suggestions in the work.

I also wish to thank the trade journals for printing notices sent to them from time to time.

Respectfully submitted,
ANDREW F. JOHNSON,
Instructor-in-Chief.

Secretary McLear said in closing: Since this report was made I have received a letter from Mr. Johnson in which he said that he had made arrangements with the trustees of the institute to get an additional room to accommodate the classes and that it is the largest class they have ever had in the history of the school to the present time.

REPORT OF SECRETARY-TREASURER H. C. McLEAR

Secretary-Treasurer's report from January 1, 1912, to same date 1913:

Cash in bank January 1, 1912		$6,263.30
Receipts during the year—dues, exhibition, and other sources	$8,215.86	
Contributions for the Technical School	2,188.85	
Associate Members Association	1,524.00	11,928.71

Expenses during the same period:		
General and regular	$8,236.21	
Trustees of the Technical School	1,987.50	
Cash in bank, January 1, 1913	7,968.30	18,192.01

The National Association of Automobile Manufacturers furnished $1,500 of the amount reported contributed to the technical school.

In accordance with Section 2 of Article II of the By-laws, we report the following new members for 1912:

Active

J. W. Anderson, Rock Hill Buggy Co., Rock Hill, S. C.
Clifford L. Barnett, San Francisco, Cal.
W. A. Bagwell, Bagwell & Gower Mfg. Co., Gainsville, Ga.
James H. Birch, Jr., James H. Birch, Burlington, N. J.
Manson Campbell, Wm. Gray & Sons Co., Campbell, Chatham, Ont.
N. H. Canady, Taylor-Canady Buggy Co., Oxford, N. C.
John J. Delker, Park Carriage Co., Henderson, Ky.
E. G. Flanagan, The John Flanagan Buggy Co., Greenville, N. C.
S. C. Griffith, Barry Mfg. Co., Indianapolis, Ind.
George C. Godfrey, Atlantic City, N. J.
R. S. McLaughlin, McLaughlin Carriage Co., Oshawa, Ont.
W. E. Maxwell, Parry Mfg. Co., Indianapolis, Ind.
A. H. Miller, Continental Carriage Co., Cincinnati, O.

B. E. Parker, Parker Mfg. Co., Cuffolk, Va.
Harry C. Phelps, The Ohio Carriage Mfg. Co., Columbus, O.
Geo. N. Penso, Kingston, Jamaica, B. W. I.
W. R. Scott, Hercules Buggy Co., Evansville, Ind.
Louis Schneller, Charles Abresh Co., Milwaukee, Wis.
George H. Schelp, Jos. W. Moon Buggy Co., St. Louis, Mo.
W. H. Tudhope, The Tudhope Carriage & Automobile Co., Orillia, Ont.
W. B. Waddill, Carolina Buggy Mfg. Co., Henderson, N. C.
Henry A. White, High Point Buggy Co., High Point, N. C.
P. J. Zimpelmann, Blount Carriage & Buggy Co., Atlanta, Ga.
Edwin S. Ziegler, Hoover Wagon Co., York, Pa.

Associate

Frank B. Ansted, Indiana Lamp Co., Connersville, Ind.
W. B. Ansted, Central Mfg. Co., Connersville, Ind.
F. Myles Brown, Louis Dusenbury & Co., New York.
Robert S. Brown, Acme White Lead & Color Works, Detroit, Mich.
J. V. Banks, Reed & Prince Mfg. Co., Worcester, Mass.
William C. Clyde, Carnegie Steel Co., Pittsburgh, Pa.
James Clemens, A. C. Chase & Co., Boston, Mass.
Clifford C. Dyer, American Screw Co., Providence, R. I.
Max Danziger, United States Varnish Co., Cincinnati, O.
William E. Diehl, Corbin Screw Co., of Chicago, Chicago, Ill.
John T. Donahue, The Cleveland Varnish Co., Cleveland, O.
Paul R. Decker, Carriage Straps, Montgomery, Pa.
Waldo R. Emery, W. R. Owen Roller Bearing Co., Springfield, Mo.
J. O. Hasson, Sherwin-Williams Co., Cleveland, O.
G. W. Huston, The Spokesman, Cincinnati, O.
G. T. Herr, The Owensboro Forging Co., Owensboro, Pa.
H. D. Hartley, The Pioneer Pole & Shaft Co., Piqua, O.
L. Harrison, Edward C. Moore & Co., Newark, N. J.
Albert Herrlinger, Herrlinger Paper Co., Cincinnati, O.
Henry Wm. Hoole, The Hickory Products Assn., Indianapolis, Ind.
F. E. Helrigle, S. Slater & Sons, Youngstown, O.
Max Jewett, The Jewett Co., Cincinnati, O.
S. F. McDonald, Ashtabula Hide & Leather Co., Ashtabula, O.
A. J. Murray, Cortland Carriage Goods Co., Cortland, N. Y.
Leigh B. Morris, Cambria Steel Co., New York.
J. A. L. Moller, Palm-Fechteler Co., New York.
Frank Medeweller, Ohio Seat Co., Cincinnati, O.
Roy C. Manson, The Novelty Tufting Machine Co., Detroit, Mich.
E. E. I. Martin, International Rubber Co., New York.
Claud Maley, Maley & Wertz Lumber Co., Evansville, Ind.
J. W .O'Bannon, O'Bannon Corporation, New York.
George B. Ogan, L. C. Chase & Co., St. Louis, Mo.
E. D. Rodgers, Cambria Steel Co., Cleveland, O.
Warren B. Rood, F. S. Carr Co., Boston, Mass.
J. Henry Smith, T. P. Howell & Co., Newark, N. J.
Matt L. Sullivan, O'Bannon Corporation, New York.
J. F. Shepard, H. G. Shepard & Sons, New Haven, Conn.
A. L. Shepard, H. G. Shepard & Sons, New Haven, Conn.
F. C. Surganty, C. A. Willey Co., Ravenswood, Ill.
Wm. F. Vosmer, Cambria Steel Co., Cincinnati, O.
Curt Woolheim, International Never Fail Pat. Carriage Window Fastener Co., New York.
J. C. F. Yarnell, Clark Bros. Bolt Co., Middletown, Conn., and Chicago, Ill.

REPORT OF FREIGHT AND CLASSIFICATION COMMITTEE

Your Committee on Freight and Classification can report that nothing of a serious nature affecting the vehicle interests transpired during the past year; the more important questions which came up were either disposed of in a manner satisfactory to us, or are now still under consideration, and such cases will be closely followed by this committee in order to fully protect our interests in any adjustment made.

The question of rates and minima affecting southwestern territory was again agitated through the Southwestern Tariff Bureau which docketed for consideration on January 23 a proposition to establish a single rate of 85 cents from St. Louis to Texas common points, subject to a single sliding scale minima as follows:

36-foot car	12,000 pounds
40-foot box car	13,500 pounds
40-foot 10-inch high car	16,500 pounds
45-foot car	18,000 pounds
50-foot car	20,000 pounds

The vehicle interests decided to offer no objection to a single rate of 85 cents, provided a single scale of minma was made as follows:

36-foot car	10,000 pounds
40-foot box car	12,000 pounds
40-foot 10-inch high car	14,000 pounds
45-foot car	16,000 pounds
50-foot car	20,000 pounds

This proposition, as usual, was opposed by the farm-wagon interests, and we are no nearer a satisfactory adjustment to a single rate and sliding scale of minima for this territory, than we have been for several years past. The entire matter, therefore, still remains unsettled, and in the meantime we will continue to operate under the two sets of rates and minima as at present.

The Official Classification lines were recently confronted by a complaint before the Interstate Commerce Commission in which certain shippers urged the establishment of a fourth class rating on spring freight or delivery wagons, with minimum 12,000 pounds on 36-foot car. This proposition was put up to us for consideration by the chairman of the Official Classification Committee, and the chairman of our committee went to New York in June to consult with the chairman of the Official Classification Committee in person, and to fully explain our views with regard to classifications affecting the manufacturers of pleasure vehicles exclusively. We have always opposed the mixing of pleasure and freight vehicles at a lower rate than would apply on straight carloads of pleasure vehicles, or in mixing in any way which would result in discrimination against the manufacturers of pleasure vehicles exclusively.

At this conference our chairman also made it known that it is our intention at an early date to petition for a reduction in minimum weights in Official Classification territory. We believe actual weights found by the railroad companies will bear out our contention that we are unable to load 36-foot cars to the present minimum of 11,000 pounds.

Regarding the Western Classification territory, numerous requests have been made for a readjustment to a sliding scale of minima to enable the small dealer to buy a 36-foot car subject to a minimum in keeping with the loading capacity of that size car. Just as soon as the Interstate Commerce Commission renders a decision in the classification complaint case now before it, we will endeavor to get the various vehicle interests together, and make an effort to get our rates readjusted to carry with them a sliding scale of minima on business for points in this territory.

In accordance with our suggestion, tariffs which provide for rates to the Pacific coast and other interior points, have been corrected to provide for specific rates on pleasure vehicles so that there would be no doubt as to what the correct rate is. Heretofore the pleasure vehicle ratings were in the group known as "Agricultural Implement Item," but specific rates are now provided for agricultural implements and farm wagons, and vehicles are now carried under the "Vehicle Group."

The chairman of the Southern Classification Committee has docketed for consideration at their meeting in Washington, which opens on October 13, a proposition to increase the minimum weight on crated vehicles, carload from 8,000 pounds to 10,000 pounds on 36-foot car with no change in the rating which is second class. A meeting of our committee with vehicle interests was held in Cincinnati on September 29, and a petition drawn up which was forwarded to the chairman of the Southern Classification Committee, strongly protesting against the proposed increase. Our committee will be deirectly represented by two of the members of our Advisory Committee, at the classification meeting, and every effort will be put forth to prevent any increase being made.

The Classification Committee at this meeting will also consider our other petition, which is that Item 26 on page 172 of Southern Classification 39, be amended to include finished parts of vehicles, so that the representatives of the Southern Weighing and Inspection Bureau will no longer have any misunderstanding in the matter of including finished parts at the carload rate. This charge will make specific a privilege that is obviously necessary, and we believe the committee will authorize the amendment asked for.

Respectfully submitted,
COMMITTEE ON FREIGHT AND CLASSIFICATION.
Theo. Luth, Chairman, Cincinnati, O.

MEMBERSHIP COMMITTEE, CENTRAL DIVISION

As chairman of the Central Division will report that we have this year gathered into the fold 24 active and 16 associate members.

It would seem at first thought that this was not a good showing, but when we consider the apparent apathy of some of the carriage manufacturers in the past two years, I feel that the results have been very good.

Your committee have worked hard to get new members and to convince the few carriage manufacturers that are not members of this grand old organization, to join.

There are very few exclusive carriage manufacturers that are not members—but another year of prosperous carriage business like this has been, and the few that are not members will be knocking at your door for admittance.

I again ask the associate members, and all their representatives, to make every effort to get the few remaining carriage manufacturers to join and help us with our good work.

This wonderful exhibit is worth many times the price of the annual dues.

The good work of our Freight Committee can not be estimated. Who else looks after the interests of the carriage manufacturers and shippers of vehicles? No one but the Freight and Classification Committee of the C. B. N. A.

If it were not for the good work done by this committee we would certainly have a much higher freight rate on vehicles; not because the railroads want to be arbitrary, or discriminate against the manufacturers of vehicles, but because they did not always understand the situation. And your committee are always on the job, and most of the time pay their own expenses. And who derives the benefit from all this work? Not alone the members of the Carriage Builders' National Association, but every carriage manufacturer in the United States.

And I want to ask the members, and those that are not members, to thoroughly examine the work that has been done by this Freight Committee. Read the report, and explain its advantages to your friends.

When one looks at the multitude of firms represented here, one would wonder that any live carriage manufacturer would have the heart to stay away and not affiliate with this grand old organization. Respectfully submitted,

MEMBERSHIP COMMITTEE, CENTRAL DIVISION,
W. H. Roninger, Chairman.

President Hull explained that, owing to ill health during the past year, Mr. W. H. Son, the chairman of the Eastern Division, has been unable to attend to the duties of his business.

REPORT OF PRESS COMMITTEE

As Chairman of the Press Committee of your organization, the first thing that impressed me was the very meager amount of publicity given by the daily newspapers to the annual conventions of the C. B. N. A. Correspondence with the other members of the committee evidenced that we were unanimous in the opinion that more publicity was urgently needed, but how to get it was the point to be considered. Your chairman easily discovered that no member of the committee, himself included, was able to devote much time to the publicity end during the convention, each one having "other fish to fry." I then suggested to Secretary McLear that a "Publicity Booth" be established in convention hall, in charge of a competent newspaper man, whose duty it would be to boil down the proceedings each day, and see that every reporter who requested information was supplied promptly and intelligently. His duties extended further, in that he was to give to the press breezy items, photographs, etc., and in this manner obtain the proper amount of publicity for this great organization. Secretary McLear wrote me to go ahead, and the experiment was tried this season, and that it has been a success all are aware who have read the very extensive articles in the St. Louis newspapers. Respectfully submitted,

PRESS COMMITTEE,
J. Frank Hutcheson, Chairman.

Mr. W. H. Roninger: Mr. Presient, in respect to this publicity matter I would like to say that our Implement, Vehicle and Hardware Association, which is our local association here, took it upon ourselves to employ Miss Annette Moore for the publicity department as far as our associate went. We did not ask the Carriage Builders' National Association whether we could do it. We thought it would be all right. There wasn't time to ask them, or ask their consent, and I want to say right here that she has done grand work. I think that we have had more publicity at this convention than we have ever had in my experience, and it is due to the good work of Miss Annette Moore—that is, partly, at least.

The president stated that the association would proceed to take action on the report of the committee which recommended officers for the ensuing year, which was presented at the previous session.

ELECTION OF OFFICERS

The report of the committee, recommending officers for the ensuing year was again read, and on motion the secretary was instructed to cast the ballot for the officers nominated and they were declared duly elected.

Under the head of New Business, Mr. Roninger said: I think this organization should take some steps to have more publicity at our future conventions through the Carriage Builders' National Association. The papers here have been full of this carriage convention this week. Heretofore there has not been as much publicity given our meetings. I think the vehicle business should be better advertised abroad before the people. I would like to have some remarks from some of our friends on that subject.

Secretary McLear reminded Mr. Roninger that at a number of previous conventions the local papers had reported the proceedings quite fully.

President Hull: I believe it would not be out of place for me to say a few words on the subject of publicity of the vehicle industry. Last December there was a demand made that there be a meeting called of the carriage industry to see if we could not by some means get before the public the fact that vehicles should demand more money. They called me into their council and asked if I would be willing as president of the association to take the initiative and call the meeting. Without getting advice from the executive committee, because I did not have time to do that, I took upon myself the privilege of calling a meeting in Chicago. I think there were about 32 members of the carriage industry and perhaps ten or twelve from the accessory trades there. We succeeded in getting the concensus of the opinion of that assembly that there should be an advance on vehicles. That was scattered broadcast throughout the country. At that meeting there was a distinctive expression made by several members prominent in the industry that the difficulty with the carriage industry today was that we were not saying enough about our goods—we have gone to sleep. There was no action taken at that meeting along these lines, but there was enough said to start people thinking—those who were there. Not a great while ago I received a letter from one of our largest builders suggesting that there be crystallized, if possible, a movement to get before the public the fact that the carriage industry is still here, reviving, as it were, the sentiment expressed in Chicago. This party said that a fund should be created by the membership of this organization and that general publicity be given the carriage industry, not for the benefit of any individual member, but that it be fostered and the work outlined by the Carriage Builders' National Association; that there was a good deal being said about the automobiles and other things that prospered, but very little being said about the buggy. I wrote to those members who were at the Chicago meeting and sent them a copy of this gentleman's letter, expressing my views in the matter, and asking for a reply. I have those replies in my pocket. They were very favorable. The time was too short to crystallize this proposition before coming to this convention, and I have not had time during our stay here to get together a number of the men who were interested in this proposition. It is my plan to turn over to our new president these letters, in order to allow him during the coming year to crystallize this sentiment—to see that we put upon the bill boards of the country the fact that the carriage industry is here to stay. That brings you up to date. It has to do with exactly what Mr. Roninger has in mind.

Mr. Taylor stated that the Accessory Trade Association had held a meeting on yesterday and it was the unanimous vote that they present to the Carriage Builders' National Association as a member of the official board Mr. Lewis Straus.

Mr. Straus thanked the association for the honor conferred.

REPORT OF COMMITTEE ON EXHIBITION

Your committee has carefully examined the exhibits and highly commends the accessory manufacturers for the high standard of excellence of the goods displayed, and for the taste shown in their arrangement.

The building is one of the best ever used for exhibition purposes, the light and ventilation being almost perfect.

Notwithstanding the fact that the building is large and com-

modious, the floor space is insufficient to accommodate all of the exhibits. This is the best evidence of the sustained interest on the part of the accessory manufacturers, as well as the carriage builders. While there are few important inventions, new styles and designs are shown in nearly every line, indicating that progress is being made and that refinements are being introduced that contribute to the appearance and general utility of the finished vehicle.

The closing of the Auditorium during business sessions has provoked some adverse criticism, but the general concensus of opinion is that the change is a wise one. Your committee believes that the closing of the exhibition hall during business sessions gives ample time for the transaction of business, and that sales and contracts are made more expeditiously because of the concentration of time.

We, therefore, heartily recommend the adoption of the plan permanently. To avoid misunderstanding in the future, we would further recommend, when space is sold, that a clause be inserted in contract reserving the right to close the exhibition hall during business sessions. Respectfully submitted,

W. A. NOTMAN, Chairman.

On motion the report was accepted.

REPORT OF OBITUARY COMMITTEE

There have been no deaths among our active membership during the past year, nor among our honorary members. But from our associate membership the Divine Power has taken from our midst during the year the following:

Thomas V. Rutter, New York, December 19, 1912, age 56.
George A. Taylor, Newark, N. J., December 18, 1912, age 57.
D. G. Mansfield, Boston, Mass., December 28, 1912, age 68.
Lewis C. Kleinsans, Newark, N. J., February 18, 1913, age 35.
A. T. A. Nelson, Cincinnati, O., February 23, 1913, age 47.
Patrick O'Brien, South Bend, Ind., August 10, 1913, age 76.
Charles K. Van Rensellaer, Philadelphia, Sept. 25, 1913, age 65.

This committee therefore presents the following resolution:

Be It Resolved, That in the death of these our fellow members, the Carriage Builders' National Association has sustained a most severe loss.

Resolved, That the association extends its sincere sympathy to the bereaved families and friends of the deceased.

Resolved, That a copy of these resolutions be made a part of our permanent records, and that a properly inscribed report be sent to the families of each of our deceased fellow members.

A. M. WARE, Chairman.

On motion the report was accepted.

REPORT OF COMMITTEE ON ABUSES OF THE CARRIAGE AND ACCESSORY TRADES

Your Committee on "Abuses" had in mind October 1, when it issued 300 advance reports to the active members of this association, and to many vehicle manufacturers who are not members, that a resolution should be passed at this meeting abolishing in full the "General Guarantee or Warrant" adopted some 25 years ago by this association.

Believing that a guarantee left the door open so that 90 per cent. of all abuses that crept into the vehicle industry could be traced to the misconstruing of the "Guarantee."

Unfortunately your committee with others, overlooked that this association in 1906, at Atlanta, voted to abolish the guarantee.

The active manufacturers of this association do not seem to have taken notice of the resolution abolishing the Carriage Builders' National Association guarantee, and have continued as a matter of form to publish in their annual catalogs and their order sheets, the usual guarantee, "The Axles, Wheels and Springs on this Vehicle are warranted for one year for private use against defects in material or workmanship."

The advance report brought your committee a great many letters urging that the guarantee should be abolished—not one has expressed a desire to have a standard guarantee.

Our secretary, Mr. McLear, yesterday received a telegram from Mr. H. J. Hodge, secretary of The National Federation of Retail Implement and Vehicle Dealers' Association, who are in session this week in Chicago, sending greetings to this association, and mentioned that they were opposed to the elimination of the Vehicle Warranty, and asking for a joint committee to prepare and report an Equitable Warranty, to which our secretary answered by wire as follows:

"Thanking you for your greetings of yesterday, we return them two-fold, trusting your deliberations will inure to your mutual advancement and success. Our Committee on Abuses feel you do not gather the full import or value of eliminating the Vehicle Warranty, and beg leave to advise by an oversight our Abuse Committee overlooked that the Carriage Builders' National Association abolished the Vehicle Warrant at the Atlanta meeting, 1906. You would be astounded at the great number that have sent letters here reaffirming their endorsement to have this association ignore the warrant, with the assurance that every reputable manufacturer expects to stand by his product so far as real defects are concerned."

Some of the oldest and best vehicle builders of this land have not published or given any guarantee and your committee recommend that all vehicle manufacturers, after 1914, eliminate from their catalogs, order sheets or invoices, any reference whatsoever to a guarantee.

We trust the next Committee of Abuses will follow this matter carefully. Respectfully submitted,

PERRIN P. HUNTER, Chairman.

St. Louis, October 16, 1913.

The report was received and placed on file.

Mr. O. S. Bannister addressed the meeting as follows: As a member of the executive committee I desire to present a resolution of thanks to the local members for the very generous manner in which they have given publicity to this convention. We also desire to extend a vote of thanks to the people who own this Coliseum and who have permitted the use of it to us without expense, and then we do not want to forget our old, true and tried friends, the trade papers, and with your permission, Mr. President, I would like to offer this resolution of thanks to be extended to all three of these interests.

The motion was unanimously carried.

President Hull announced that the selection of the next place of meeting would be in order.

Secretary McLear stated the following cities had extended invitations to the association to hold their next meeting in their respective cities: Denver, Galveston, New Orleans, Chicago, New York, Buffalo, Indianapolis, Old Point Comfort and Atlantic City. Atlantic City was chosen.

Thereupon the convention adjourned sine die.

MEETING OF THE ACCESSORY ASSOCIATION

Immediately after the close of the Thursday session of the Carriage Builders' National Association the associate members of the Carriage Builders' National Association met.

The meeting was called to order by Mr. Elmer J. Hess, president.

The following Nominating Committee was appointed to recommend officers for the following year: W. P. Champney, Charles E. Adams and Harry N. Hill. That committee recommended the following officers for the ensuing year:

For President—James F. Taylor, Cincinnati, O.

Fir Vice-president—Elmer J. Hess, Cincinnati, O.

For Treasurer—O. E. Walker, Cincinnati, O.

Members of Executive Committee—Elmer J. Hess, Cincinnati; W. F. Gibbons, Cleveland; John McGrath, Cleveland.

On motion report was accepted and the ballot of the association cast for the members recommended and they were declared elected.

The association, on motion, recommended for the consideration of the C. B. N. A., Mr. Lewis Straus to act as a member of their executive committee.

On motion, the treasurer was requested to mail his report to the subscribing members as usual.

The meeting then adjourned.

THE EXHIBITORS

What They Exhibited, Who Was in Charge, the Souvenir.

Automatic Axle Co., Lancaster, Pa.—Carriage and automobile axles A. H. Worrest.

Backstay Machine & Leather Co., Union City, Ind.—Wire wound prop blocks, front valances, shaft straps, automobile straps, and an extensive line of leather novelties for carriages and automobiles R. C. Shemmel, S. H. Clark. They gave as a souvenir a walking stick

Bishop Mfg. Co., Barrington, Ill.—The Bishop coupler. M. T. Bishop

Buser-Poston Tufting Machine Co., Chillicothe, O.—Complete drive hydraulic tufting machine press in operation, with demonstrations in the making of carriage cushions and backs. They also displayed

their new lightning grip glue clamps, as well as button holders plaiters and mould boards. B. C. Poston, secretary and general manager, and Joe Federla. They gave as a souvenir a tire patch outfit.

C. C. Bradley & Son, Syracuse, N. Y.—Carriage shaft couplings Frank L. Scharff, C. C. Bradley, Jr., secretary; B. B. Lynch, of Baltimore, and Joseph Wallenstein, of Cincinnati.

L. C. Chase & Co., Boston—Rubber carriage ducks and drills, and their leather substitute "Chase" leather. The exhibit also included a full line of Mohair top materials, and their new line of "Drednaut Motor Cloths," which they are just now introducing to the trade Geo. B. Ogan, resident agent in St. Louis; William Walden, George E. Sawyer and James Clemens.

Catley & Ettling, Cortland, N. Y.—A complete buggy top equipped with Catley buggy top springs and levers, and roller wear irons Mrs. Alice M. Ettling was in charge.

Cleveland Hardware Co., Cleveland, O.—Their extensive line of carriage forgings, including body hangers, body loops, steps, roller chafe irons, shaft and pole irons, axle clips, shaft couplings, gear sets and a general line of top hardware consisting of bow sockets top joints and shifting rails. Charles E. Adams, William F. Gibbons James R. Swan, A. O. Allan, O. T. Saunderson, P. W. Andrus, Carl E. Andrus, and J. W. Baxter.

Central Mfg. Co., Connersville, Ind.—Metal bodies, showing same with four square corners, four round corners and two rear round corners, with front corners square; one-piece metal seats. For the first time the concern displayed their new 1914 one-piece limousine metal buggy seat which they have been working on for the past twelve months. Ward Halladay.

C. Cowles & Co., New Haven, Conn.—A large line of carriage hearse, pillar, dome, tail and side oil-burning lamps; also electric lamps for all horse-drawn vehicles, and exterior and interior mountings, etc., for all open and closed work. L. C. Cowles, M. A. Bottome.

Crandal, Stone & Co., Binghamton, N. Y.—Automobile top hardware and trimmings, tubular bow sockets, shifting rails, top braces, carriage hardware and trimmings. E. C. Titchener, president; N. A. Boyd; W. D. Gordon, western representative; Otto Heinrichsdorf, central state representative, and B. B. Lynch, who travels southern territory. Safety razors were handed out as souvenirs.

Cortland Forging Co., Cortland, N. Y.—Their line of automobile and carriage forgings. F. L. Titchener, president; C. M. DeVany, treasurer; W. D. Gordon, E. H. Seese, J. R. DeVany, and E. A. Brown

The George R. Carter Co., Connersville, Ind.—Leather welts and gimps and an interesting assortment of straps. Geo. R. Carter, president; Cutris Withrow, vice-president, and H. A. Carter.

Cortland Carriage Goods Co., Cortland, N. Y.—An automobile buggy seat equipped with their new shifting rail, a novelty that attracted much favorable attention. Robert L. Brewer, president; Jesse Jennison, manager of sales; A. W. Curtis, A. E. Roninger, Melville Ritchie, and Marshall C. Wood.

Carriage Woodstock Co., Owensboro, Ky.—A complete line of shafts and gear woods, as well as a few bodies and seats. Chas. O. Mainor, manager.

F. S. Carr & Co., Boston—Top coverings and fabrics. L. W. Repsold, W. B. Rood.

Campbell & Dann Mfg. Co., Tullahoma, Tenn.—Poles and shafts. J. L. Dann.

R. N. Collins V. W. W. Co., St. Louis.—Carriage woodwork. Mr. Blume.

Ditzler Color Co., Detroit, Mich., were represented by F. W. Ditzler, John A. Creighton, Kirke W. Connor, and R. E. Rodriguez, of New York, their eastern agent. They gave to callers at their booth a handsome leather pocket folder with memorandum pad, containing sample set of transparent over-lays and color cards showing suggestions for 1914, together with their new price list.

D'Arcy Spring Co., Kalamazoo, Mich.—Coil springs. Frank P. D'Arcy.

Eberhard Mfg. Co., Cleveland, O.—The largest exhibit in the hall, showing their very extensive line of carriage and wagon hardware. W. Austin, J. Erret, W. P. Champney, C. A. Kennicke, L. D. Lutz, C. N. Samuelson, Geo. B. Shepard, Henry Rohde, C. U. Samuelson.

Richard Eccles Co., Auburn, N. Y.—Special drop forgings. W. W. Eccles and A. H. Johnson.

DuPont-Fabrikoid Co., Wilmington, Del—Fabrikoid leather for trimming and upholstery work on all kinds of vehicles. J. K. Rodgers, Harry E. Herman, Everett Hasbrouck.

Fernard Mfg. Co., North East, Pa.—Quick-shift couplers. R. J. Matthews.

Ferrell Brake Co., Cleveland, O.—Carriage and wagon brake. J. F. Reynolds.

Firestone Tire and Rubber Co.—Occupied one of the largest spaces which was tastefully decorated for the reception and entertainment of their customers. H. S. Firestone, president; R. J. Firestone, sales manager; E. S. Firestone, Cincinnati branch manager; A. W. Moore, Chicago; Wylie West, Atlanta; T. B. Talbot, Dallas; J. B. Patterson, St. Louis; C. H. Sarrick, Akron; A. B. Cleaveland, Detroit; E. S. Babcox, advertising manager; Geo. A. Talbot, special representative, and H. W. McFadden, Houston, Tex. A very handsome pack of playing cards was given out as a souvenir.

Fairfield Rubber Co., Fairfield, Conn.—Their extensive line of carriage cloth, imitation leather, etc. E. W. Harral, president; A. C. Wheeler, treasurer, and Geo. W. Husted. Their souvenir was a pocketbook of unique design.

Fitch Gear Co., Rome, N. Y.—Carraige and wagon gears and hardware specialties. Mrs. L. M. Fitch, John Herbst.

Federal Rubber Mfg. Co., Milwaukee, Wis.—Federal, Defender, and Cushion carriage tires mounted on reels on nickel plated stand with full line of samples and literature for distribution. They gave as a souvenir a very practical hat brush. H. E. Smith, Chicago; M. C. Center, Cincinnati; F. A. Lidle, St. Louis, and Charles Measure, manager solid tire department.

Goodyear Tire & Rubber Co., Akron, O.—Their booth was largely devoted to the reception of customers. They displayed a few samples of carriage tires. G. M. Stadelman, secretary; C. W. Martin, manager carriage tire department; A. E. Cass; H. E. Taylor, Chicago; L. L. First, Cincinnati; J. A. Maroney, St. Louis; W. W. Calahan, Milwaukee; A. W. Ellis, Louisville; W. V. Logan, Chicago; A. G. Cameron, St. Louis. Souvenir, box of assorted rubber bands.

Gramm-Bernstein Co., Lima, O.—1914 model 3 1-3 ton chassis. B. A. Gramm, general manager; W. H. Moore, sales manager; M. W. Cochran, St. Louis.

Edmund F. Heath & Son, Newark, N. J.—Patent leather. T. W. Gilbert.

Herbrand Co., Fremont, O.—Body loops and hangers, wrenches, and some automobile forgings. C. F. Thompson and Chas. Thompson.

Indiana Lamp Co., Connersville, Ind.—A full line of electric lamps, comprising straight electric, combination oil and electric, oil lamps and gas lamps for buggies and surreys. Frank B. Ansted, vice-president; William F. Thoms, sales manager. A very handsome imported paper cutter was given out as a souvenir.

Ideal Lamp Co., Cincinnati, O.—A complete line of oil and electric carriage lamps. W. C. Klein, president, and V. E. Shields, secretary.

Illinois Iron & Bolt Co., Carpentersville, Ill.—Their line of axles for carriages, buggies, and wagons. H. C. McNeil, treasurer, and W. C. Martin.

Keystone Forging Co., Northumberland, Pa.—A line of gear sets (especially the Dixie), as well as body loops, and Bailey and Keystone hangers, also clips, stay braces, shaft irons, etc. Isaac Cornwell, general manager; J. D. Weeks, sales manager, and T. O. Van Alen, secretary and treasurer.

Kelly-Springfield Tire Co.—Carriage tires. Space largely devoted to reception of customers. V. H. Cartmell, J. B. Carry, A. H. Bolger, O. R. Cook, H. S. Cox, F. W. Holcomb, H. L. Smith, M. E. Towner, John Glenn, C. H. Allenbough.

Geo. H. Lounsberry & Sons, Cincinnati—Button machine. A. F. Lounsberry. Souvenir, picture hangers.

Wm. R. Laidlaw, Jr., New York—Carriage and automobile fabrics. Wm. R. Laidlaw, Jr., E. T. Griffin, J. Johnson, Clyde Judd, R. L. Kingston.

King Fifth Wheel Co., Philadelphia, Pa.—King roller bearing fifth wheel and iron platform circles. A. O. Chase, general sales agent.

Liggett Spring & Axle Co., Pittsburgh, Pa.—Buggy and wagon axles and springs, automobile springs, and automobile axles, with sections cut away so as to show the internal workings. H. R. McMahon.

Lowe Bros., Dayton, O.—Vehicle undercoatings, colors, and color varnishes. W. J. Sohlinger, manager manufacturers' sales department, and Harry Williamson.

Mutual Wheel Co., Moline, Ill.—Vehicle wheels. Geo. McMaster, William Neekamp.

Metropolis Bending Co., Metropolis, Ill.—Shafts, poles and gear-woods. J. H. Park, Marshall Wood, and G. W. Luetkemeyer.

Metal Stamping Co., Long Island City, N. Y.—Their regular line of carriage trimmings and hardware, including the standard coupler, ball bearing coupler, etc. John F. Galvin, president, and Otto J. Bauer.

Muncie Wheel Co., Muncie, Ind.—The Storm King and the Bannister wheel, also their regular Sarven & Warner types. O. B. Bannister, president; H. B. Bannister, treasurer, L. P. Bannister. An ivory fan was given to the ladies as a souvenir.

Monarch Carriage Goods Co., Cincinnati, O.—Carriage wood work. C. J. Rennekamp.

National Malleable Castings Co., Cleveland, O.—Space entirely devoted to reception of customers. C. W. Hotchkiss and J. H. Redhead.

New Wapakoneta Wheel Co., Wapakoneta, O.—Vehicle wheels. Ed Trau, manager.

Perfecto Light Co., Des Moines, Ia.—Electric lights for vehicles. R. X. Schumacher.

Pioneer Pole & Shaft Co., Piqua, O.—Ironed poles and shafts. John Heubach, manager of St. Louis plant; E. C. Sendelbach, W. A. Snyder, and A. R. Friedmann.

Peters & Herron Dash Co., Columbus, O.—Booth devoted entirely to reception of customers. Charles M. Peters, president; J. D. Kilmer and M. J. McDaughy.

P. Reilly & Son, Newark, N. J.—Cut leathers for tops and trimmings. W. G. Peters, Chas. J. Clark.

James H. Rhodes & Co., Chicago, Ill.—Sponges and chamois, together with samples of different kinds of pumice stone carried. Elmer R. Murphey, president; P. L. Beck.

Rose Mfg. Co., Philadelphia—"Neverout" lamps for carriages. H. R. Koslowsky.

E. M. Rand, New York—Carriage and automobile fabrics. E. M. Rand.

Reid Coupler Co., Clinton, Ind.—Reid automatic shaft coupler. I. D. White.

R. E. Rodriguez, New York—Large assortment of paint brushes; shown in connection with the Ditzler Color Co. R. E. Rodriguez.

Sidney Manufacturing Co., Sidney, O.—Depressed panel metal auto buggy seats, with some entirely new designs for 1914, also a one-piece metal runabout seat and metal piano box bodies. A. A. Gerlach, secretary and treasurer, and W. A. Burket.

Standard Varnish Works, Chicago, Ill.—Space entirely devoted to reception of customers. Arthur Davis, I. L. Stonehill, C. M. Bradley and E. C. Sullivan. Souvenir, a silver pencil.

Standard Wheel Co., Terre Haute, Ind.—Carriage and automobile wheels. Carl D. Fischer, general manager; Emil J. Fischer, assistant general manager, and Fred J. Frisz.

Schubert Gear Co., Oneida, N. Y.—Space devoted to reception of customers. George Schubert. As a souvenir big red apples were handed to all visitors.

St. Louis Surfacer & Paint Co., St. Louis—Carriage paints. W. S. Avis, H. C. Avis, Ed. E. Walker, W. H. Walker. A handy shoe polisher was their souvenir.

Edward Smith & Co., New York City—Colors, color varnishes and carriage varnishes. James F. McBride, F. K. Light and F. B. Higgins. A handsome ash tray was given as a souvenir.

Sheldon Axle Co., Wilkes-Barre, Pa.—"Ton-Don" and "Empire" axles and springs for both carriages and automobiles. J. Fred Armstrong, secretary; W. J. Daniels, J. B. Decker, W. D. Gordon, E. J. Roth, O. A. Timberlake, W. B. Timberlake, H. W. Bowman. Souvenir, a magnifying glass.

St. Marys Wheel & Spoke Co., St. Marys, O.—Vehicle wheels, wheel material and carriage woodstock. J. W. McLetchie.

Timken Roller Bearing Co., Canton, O.—Axles. C. E. Staley.

Sherwin-Williams Co., Cleveland, O.—Color selections for 1914. Undercoatings and "Free Flowing" color varnishes. D. J. Moore, F. A. Randall, James Sterling, J. O. Hasson. Cuff links were distributed as souvenirs.

Union Bow Co., Cleveland, O.—Full line of bows. G. W. Luektemeyer.

Valentine & Company, New York and Chicago—The exhibit consisted of a revolving wheel, which they call their "soap test," numerous panels finished with their products and charts of colors. F. H. Rose, T. A. Knight, J. F. Dugan, W. F. DeWolf. As souvenirs, aluminum pencils and pocketbooks were distributed.

Wade Mfg. Co., Brockton, Mass.—Wade leather, and imitation leather welts, bindings and trimmings; special designs of bindings and rolls of welts, and bindings of various colors. Ashton Hamilton, Chester A. Helm.

D. Wilcox Manufacturing Co., Mechanicsburg, Pa.—Gear woods and carriage hardware and one of the new hollow drop forged spring bars, the latter being one of the features of the exhibit. L. E. Hickok, sales manager.

C. A. Willey Co., Hunter's Point, N. Y.—A choice selection of colors, some of which are late productions of a high grade character. W. E. Orr, vice-president and treasurer; George B. McClain; F. C. Surganty, of Chicago; Robert W. Bowen, of St. Louis; David Anderson, of Hagerstown, Md.; Eugene Holler, of Rock Hill, S. C.; H. C. Willey, of Oberlin, O.

Western Spring & Axle Co., Cincinnati, O.—The constituent companies are the following: Cincinnati & Hammond Spring Co., Cincinnati, O.; Ansted Spring & Axle Co., Connersville, Ind.; Hess Spring & Axle Co., Carthage, O.; Cleveland Axle Mfg. Co., Canton, O.; Cleveland-Canton Spring Co., Canton, O.; J. B. Armstrong Mfg. Co., Flint, Mich.; Hess-Pontiac Spring & Axle Co., Pontiac, Mich.; Champ Spring Co., St. Louis, Mo.; Spears Axle Co., Wheeling, W. Va. Harry Roettinger, N. B. Champ, C. Heflinger, J. W. H. Sasse, J. B. Childs, E. J. Hess, Geo. W. Ansted, W. T. Denis.

West Tire Setter Co., Rochester, N. Y.—Rochester helve hammer. E. A. Grenelle and S. E. Tumalty.

Walter A. Zelnicker Supply Co., St. Louis—Marking crayons. W. A. Zelnicker, G. S. Hoke, G. H. Hessing, H. J. Elson.

THE BANQUET

Nearly four hundred men were in the Planters' banquet hall when the toastmaster, President Hull, rapped for order and presented Rev. A. J. Williamson, who delivered the invocation, following which a toast was proposed to the President of the United States and to President-elect Roninger, both of which were responded to with much enthusiasm.

The speeches following the refreshment of the inner man were exactly the right sort for such an occasion. They were liberally seasoned with humor and contained only a small quantity of dry facts and tiresome statistical matter that too often mark such occasions and rob them of pleasure. A good orchestra dispensed music liberally during the evening, aided by the voices of the diners when popular songs were played.

In opening the speaking program, Toastmaster Hull spoke of the splendid hospitality with which the conventioners had been received by St. Louis, and introduced Mayor Henry W. Keil, who, in a brief address, told some very interesting facts concerning St. Louis, both as a convention city and as a business center. F. B. Gardner followed in similar vein, and C. Porter Johnson gave a rousing introduction of Judge O'Neill Ryan.

Judge Ryan referred to the banquet held by the C. B. N. A. in St. Louis, September 22, 1898, at which he was one of the speakers, and roused the patriotic feelings of the banqueters in a ringing speech on the subject of "Our Nation."

Dr. Williamson gave a masterly address, in which, amid sparkling wit and humor, he talked of the "Deeper Ministry of Business" in a manner that left a lasting impression on the minds of his audience. Of his address we quote a few of the stronger paragraphs:

It is the growing desire of men to get together and to make of this nation and of the world one great company of brothers with the great God over all, and as surely as we live tonight that is the trend of affairs. That is the significance of this whole modern movement of cleaning up political life and social life. It is not the desire for muckraking, but it is saying to every kind of a man, "You shall not do anything that will keep us from being brothers, and keep us from having the deepest and truest confidence in our fellow man."

When you go away from this place tonight you are going to rejoice in that larger fellowship. A man is not rich because of what he possesses himself. If a man lives for himself he falls at death like the raindrop in the sea. It is only as he extends his personality in the love and affection of his brothers that he really is rich and by this kind of a meeting you have extended that fellowship.

I am going to speak very briefly tonight, but on the deeper significance of business, on the deeper ministry of business. There was a time in the history of this world when the most unfortunate divorce occurred that we have ever known, a separation, fancied and not real, between what men call the secular and the sacred. Now you will find that that does not go so far back in history, but it was a maliciously wicked divorce, when certain men and certain enterprises, religious so-called, were set off on one side as holy callings and holy businesses and other men were relegated to another sphere with the charge that "your business is not holy," and many a man has lived the holy round of his life feeling that his business was not spiritual; that it was purely secular and selfish and that the living of holy service belonged to men who were dedicated to some specific ministry of God. How gloriously we are getting past that. Men are understanding that every man's ministry is holy, not because of any special ordaining to his task, but because of the spirit in which that task is done.

Now, will you stop just a moment to see that this is only the simplest incident in life and that man's ordinary service, if his business is clean, is of vastly more importance than any sums of money he gives away, important as that is and valuable as that is.

Take the carriage builders. Think how you have made it easier for the whole life of the world. When you began to build carriages you took a man of whom the Bible said that his days were three score years and ten and you made them twice three score years and ten, and you helped the ordinary man to live as long as Methuselah lived, though he had more

than 900 years. You have added to the life and pleasure of the whole world. Will you think tonight as your mind goes out all over this wonderful land of 90,000,000 of people, how much actual pleasure and profit and delight there has been brought to the 90,000,000 of people by the institutions that are running on wheels and that you men helped to build?

I hope you won't understand that the balance sheet at the end of the year contains what your labor has amounted to for that year, and so my thought tonight is that every man shall spiritualize his calling and shall understand that he is a servant of the living God because he serves his fellow man.

Money? We are called a commercial age; that is our thought and curse. We have tried as Americans to escape from it, but was ever a man in this world paid for honest work? Tell me? What was Daniel Webster's salary? I do not know. But is there money enough on earth tonight to pay Daniel Webster's salary that he honestly earned? Could you pay Abraham Lincoln? Could the men of the south pay Robert E. Lee? Is there on this God's green earth tonight enough gold to pay Thomas Edison for what he has done for this world? Why, you can't measure that service in coin.

Mr. Eugene H. Augert, of St. Louis, convulsed his hearers with a ten minute talk on his experience (?) with automobiles, and Harry Quine, of Akron, closed the speaking program with a talk on the subject of good roads.

CELEBRATION BY A VETERAN CARRIAGE BUILDER

On October 8, Mr. and Mrs. D. W. Miller, of 1827 Sherman avenue, Cincinnati, celebrated the forty-fifth anniversary of their wedding. Of their children and grandchildren who were present were the following: Mr. and Mrs. J. Clifford Miller and their three children, Mr. and Mrs. Harry G. Miller and their three children, A. F. Chapman and son Robert.

The illness of Mrs. Wallace L. Miller prevented her and her family from attending. There are four grandchildren in Atlanta, Ga., and three in Cleveland, O., who were too far away to come.

Mr. Miller is the head of the music school which bears his name. He is of Scotch-English stock, which settled in Long Island, N. Y., in 1648, and is the oldest grandson of Geo. C. Miller, one of the early settlers of Cincinnati and a very influential citizen, manufacturer and banker.

D. W. Miller served in the Union army during the civil war and at its close engaged in the music publishing business. Later he joined his father, at his urgent request, in the carriage manufacturing business.

In a few years he embarked alone and made money very rapidly. He built one of the largest factories in Cincinnati, also one in Hammond, Ind. Both are still in operation. He built a third factory at Hammond, Ind., which was destroyed by fire.

His carriages were noted for beauty of design and excellence of workmanship, attracting the patronage of the rich and prominent people of Cincinnati. He won the warm friendship of carriage builders, and the Carriage Builders' National Association made him an honorary life member.

MICHIGAN BUGGY COMPANY AFFAIRS

It is reported that more than $100,000 has been pledged in Kalamazoo toward a fund of $300,000 for the purchase of the Michigan Buggy Co.'s plant, now in the hands of a receiver. The citizens of Kalamazoo are anxious to retain the industry and fear that if the present plans are carried out the machinery and equipment of the company will be sold in piecemeal at auction.

As previously reported a Chicago auctioneer has offered $225,000 for the property and the offer has been accepted with a provision that the plant must be offered for sale to the highest bidder, the Chicago man to guarantee that the net proceeds will equal the above amount.

Kalamazoo people who have contributed to the $100,000 fund are anxious that the property should fall into the hands of the Gerber interests which are making an effort to obtain it, with a view to reorganizing the company and operating the plant. Among the contributors are a number of the department heads of the old company. The Commercial Club of Kalamazoo has voted $10,000 to the fund, and it is expected that the Gerber interests will bid at least $275,000.

ELECTRIC MAKERS ELECT

The largest gathering of members of the Electric Vehicle Association of America took place on October 27, in the La Salle Hotel in Chicago, the occasion being the fourth annual convention of the organization. The outcome of the election placed Frank W. Smith, vice-president of the United Electric Light & Power Co., of New York, in the president's chair, relinquished by Arthur Williams, who is general inspector for the New York Edison Co., who, however, was elected a member of the board of directors. Smith was vice-president of the association and his place is taken by J. F. Gilchrist, of the Commonwealth Edison Co., of Chicago; Harvey Robinson, of the New York Edison Co., and Day Baker, New England manager of the Edison Storage Battery Co., were re-elected secretary and treasurer, respectively. On the board of directors, both Wm. P. Kennedy, consulting transportation engineer, and W. G. Bee, vice-president of the Edison Storage Battery Co., were re-elected, and C. N. Stannard was elected to serve his first term.

Following out the set program, Dr. E. E. Pratt, manager of the industrial bureau of the Merchants' Association of New York, opened the first business session with a paper entitled, "Traffic Problems and the Automobile," in which he laid great stress upon the necessity for co-operation, rather than antagonism, between the law makers and the general public. Following Dr. Pratt, F. Nelson Carle presented a paper entitled, "The Merchant, the Central Station and the Electric Truck," and this was followed by a paper entitled "Co-operation Between the Electric Vehicle Manufacturer and the Central Station," by E. L. Callahan. On Tuesday the session was opened by M. R. Berry, of the Electric Products Co., whose topic was, "Charging Storage Batteries in Unattended Garages."

The remainder of the set program included talks by G. H. Kelly and E. J. Bardell, of the Baker Motor Vehicle Co., on electric vehicle salesmanship; C. A. Duerr, of Gimbel Bros., and D. L. Tobias, of the United Electric Light & Power Co., on the electric vehicle in department store service; Bruce Ford, of the Electric Storage Battery Co., on recent developments in the lead battery for vehicle work; and F. A. Whitney, of the Commercial Truck Co., on electric commercial vehicle tires. Except for "time out" for theatre parties and a dinner the whole of the two days of the convention was devoted to set papers.

MECHANICSBURG GETS HINKLE SPOKE FACTORY

Application for a charter has been made by the J. K. Hinkle Mfg. Co., Mechancsburg, Pa., which will soon start work in the old F. Seidle plant, which has been idle for some time. The incorporators of the new concern are J. K. Hinkle, H. A. Shriver, E. L. Stansfield, I. G. Hinkle and M. L. Lutz. The officers are as follows: President, J. K. Hinkle; vice-president, H. A. Shriver; treasurer, E. L. Stansfield; secretary, M. L. Lutz. The F. Seidle estate and the bending plant of Seidle & Hinkle, which adjoins, will be occupied by the new company. The machinery from the Hinkle plant in Dillsburg will be moved.

"Cost" Today the Most Vital Issue Before the American Public

Paper read by George R. James before the C. B. N. A.

The question of the Cost of Living is affecting practically every man, woman and child in the United States. It is the paramount issue before the law makers in Washington, and it is forcibly brought before the attention of the general public by the daily papers and the periodicals. Therefore, that this matter of cost should be the most important feature of the manufacturing business should not be a surprise to any thinking man.

Every business man, who even hopes to make a success of his business, must necessarily have an accurate knowledge of what his goods cost, as well as a knowledge of what it costs to conduct the business. This applies to all lines and character of business, whether it be manufacturing, jobbing or retailing.

I have been engaged in the managing end of a wagon business since 1885 (more than 27 years), and have always felt a keen interest in the work of the Wagon Association. During my experience I have seen the industry, from a profit-making standpoint, go steadily from bad to worse, and have seen failure after failure in every attempt to regulate prices by agreement.

There never was, nor ever will be, a time when an association or body of men can get together and regulate selling prices by any sort of an agreement. Long before the passage of the Sherman Anti-Trust Law, the majority of the members of the Wagon Association realized the impossibility of bettering the condition of the industry, by discussing, or attempting to regulate, selling prices.

Efforts to Control Prices

In the olden days the Wagon Association would hold meetings, and make efforts to control selling prices, through the medium of a so-called "gentleman's agreement." It is needless to say that such agreements were never satisfactory, and were never the means of producing the desired results. Instead of creating a co-operative spirit among the manufacturers, it brought about a feeling of distrust and antagonism, which I regret to say, has never been fully eliminated.

Association work can be made of the greatest help to the manufacturers, in any line of business, when it comes to the matter of discussing costs, and the abuses that creep into the industry, and through the discussion of the matter of costs and abuses, the elimination of such goods as may be unprofitable to the manufacturer.

Mr. C. A. Geiger, of the Troy Wagon Works Co., Troy, O., deserves credit for being the first one in the farm wagon line to realize the importance of the "costs" of producing wagon, as related to the success of the wagon industry. This was some fifteen years ago, and at that time Mr. Geiger came forward with the idea that practically all of the trouble, and all of the success, of the wagon industry depended upon a knowledge of "cost."

At first this theory was treated as of little importance, and even at this late day there are some of the people engaged in manufacturing wagons, who still make no effort to ascertain their costs, but depend upon the "other fellow" to set the pace for them, and make both their prices and terms. However, the majority of the members of the Wagon Association have awakened to the necessity of having correct cost knowledge, and are earnestly striving to perfect the methods to get at just what it costs to produce their goods.

Nearly all successful manufacturing concerns today have installed in their business a more or less elaborate cost finding system. Now, I have no war to make on any system of cost finding, provided it gives a full and complete "return" of the actual cost of the goods, including all the costs of conducting the business.

There is no cost system, so far as I know, that is absolutely correct. That is to say, which will tell in advance just what it is going to cost to produce or manufacture a certain article. The best that can be done is to depend upon past experiences, on which, by percentages and averages, can be told what certain operations cost, after such operations shall have been completed.

I have installed in my own business a very simple, but effective cost finding system, which is primarily based upon the "pay and take," or the results of the last year's business, made up in the form of a statement, subdivided so as to readily fall in line with the requirements of the Federal Government, in making the "Annual Return of Net Income" to the Internal Revenue Bureau.

Under my system it is necessary to have the net costs of the material going into the makeup of the product, and also the productive labor, and by productive labor is meant the wages paid to those persons engaged in the actual process of manufacturing.

All other items of expenditure, which of course go to make up the sum total of the cost, are figured by percentages.

Since it is only necessary to have an accurate knowledge of the cost of the material (which information should be furnished by the department, or persons making the purchases) and the productive factroy labor (which information can easily be obtained by using a card system, to be handled by the various foremen and checked by the timekeeper or man who makes up the pay-roll), the cost of maintaining this system is exceedingly light.

Booklet to Be Published

I now have in the hands of the printer a pamphlet setting out in detail my cost finding system, which I have had prepared for the benefit of those in the wagon business, who either have no cost finding system, or who are not altogether satisfied with the system they have in use.

Since this system can readily be applied to any line of business, I would be very glad to send a copy of this work to any member of this association who will write me, or my office, for a copy.

The great value of association work, or co-operation in discussing the matter of costs, is by comparing one's own cost on certain lines of goods with the costs of others engaged in manufacturing the same product, thereby proving one's own figures by the results obtained in the "other fellow's" plants.

In the Wagon Association our great trouble in securing data for making a comparison of costs arose from the various methods of cost accounting, and the inability to agree as to just what we were talking about when we asked for costs on some one given wagon. It is, therefore, very important that when

an association undertakes to make cost comparisons, a formula should be prepared, upon which each of the members is to make the "return," and it is also desirable that full specifications be sent each member, covering exactly the character of the job, both as to grade and parts, in order that each may figure on exactly the same thing.

To illustrate this point, I call your attention to an experience in the Wagon Association which occurred only a short time ago.

Last March a few of the wagon manufacturers were asked to report costs on a wagon of given specifications, the wagon inquired about being one that would represent something like 50 per cent. of all the wagons marketed in the middle west, and one that would be common to each of the factories of whom inquiry was made. The specifications, of course, were the same for each of the plants, and the question was: "What is the total cost, delivered in the warehouse ready for shipment, including all expense of any kind, and also including the cash discount?"

The Story of an Experiment

The responses to this inquiry varied to a marked degree. One large concern, whose figures came nearest to the average, reported a cost of $62.81. Another large concern, making approximately the same number of wagons and furnishing practically the same vehicle as the other, reported a cost of $53.09. Here was a difference of $9.72, or in other words, factory No. 2 was reporting a cost which was 18.3 per cent. less than the cost in factory No. 1.

Each concern had a cost system in daily operation, and each was satisfied as to the correctness of the cost reported. Understand, these cost figures had been given the respective sales managers as a basis for making selling prices, and while the reported cost in factory No. 1 was 18.3 per cent. higher than that of factory No. 2, it was generally known that both were making practically the same selling prices. Factory No. 1 was very much dissatisfied with conditions as shown by its report, whereas factory No. 2 was quite content, because of the handsome margin of profit shown by comparing its selling price with its reported cost.

This condition started a line of thought in my mind as to how best to get at the error, which I was certain existed in one or the other of the two plants. I was satisfied that factory No. 2 could not purchase its material or labor for any less than could factory No. 1, and in spite of the fact that factory No. 2 seemed absolutely certain as to the correctness of its cost figures, those figures were so out of line with the other plants reporting, that I determined, if possible, to get some method of reporting costs that would give us more uniform results.

After considerable thought and study I prepared a formula for reporting costs and selling prices of wagon, which was prepared to conform with the requirements of the United States Revenue Bureau, in making the "Return of Annual Net Income."

After getting this formula in shape, by consent of the various factories, our association employed the firm of Haskins & Sells, certified public accountants, to go to each of the consenting factories and make up, on this particular formula, from the figures on the books of the various factories, a report of costs, on several different specified wagons, and submit a comparative statement, showing the results obtained in the various plants visited.

As a result of this investigation by Messrs. Haskins & Sells, their report, made to the manufacturers who had participated, showed that there was but little variation in the total cost of manufacturing the specified wagons in the different plants.

In the case of the two factories referred to a few moments ago (No. 1 having reported, in March, a cost on a certain wagon at $62.81, and No. 2 giving a cost of $53.09), these two factories, when reported through Haskins & Sells, after the investigation, showed the cost for No. 1 as $63.15, and for No. 2 as $63.04, so that, instead of there being a difference of $9.72 between the two plants, there was in reality a difference of but 11 cents.

This I regard as conclusive as to the necessity of having a uniform method of reporting costs, and emphasizes the advantage of all parties engaged in an industry computing their costs upon the same basis.

In addition to showing how closely different plants will come to having the same costs on a specified job, a comparison of cost figures, on the basis I have outlined, will reveal another fact which is most interesting and which relates to the "volume" of business.

The idea that by increasing the "volume" of business a manufacturer can reduce his cost of production, is correct only in a very limited way, and a comparison of costs made between the costs in very large plants will vary but little with the smaller factories, provided both figured on the same identical class or kind of work.

Volume Does Not Affect Cost

The popular idea as to increased volume reducing cost is actually exploded, since it has been proven it does not always follow that the very large plant can produce a given article at less than can the smaller manufacturer.

As evidence of this fact I submit that, in the recent compilation to which reference has already been made, the cost of the average of five wagons, made in the factory of the largest concern in the wagon business, and where something like 60,000 wagons are turned out per annum, was $49.74; whereas, the average cost of turning out five wagons, built upon the same specifications, in the plant of the "James & Graham Wagon Company," where approximately 6,000 wagons are made per annum, was $48.52, or in other words, the "little fellow" built this average wagon at $1.22 less than did the big one.

This sounds like an incredible statement, but it is nevertheless a statement of fact, so the question naturally arises, "How do you account for this condition?" Unhesitatingly, I answer, "Variety!"

With the increased volume in the large factory, the increase in variety of goods produced necessarily follows, and no condition about a factory tends to increase cost as does an increase in variety.

Volume of business, for which so many of us strive (and incidentally go broke in the effort) has a tendency toward decreasing the cost of production only up to a certain point, and if increased volume means increased variety, then there is sure to be an increase rather than a decrease in cost.

It is well to keep these facts in mind, for no one is so badly fooled as is the man who fools himself.

The way to arrive at an accurate viewpoint is by an authentic knowledge of the cost of one's goods as produced in his own factory, and then comparing these costs with the costs in the factories of his competitors.

Having before him his own costs, checked by comparison with the costs of his competitors, the successful manager will look over his selling prices, as compared with his costs, and will begin the work of elimination of the unprofitable goods from his product. This action not only "stops a leak" at once, but by a reduction in variety, reduces the cost of producing the profitable line, and therefore, does double duty.

Another element of cost most worthy of consideration is the relationship of the location of the factory to the market in which attempts are made to sell goods.

If the freight from your factory to a certain market is much higher than it is to that market from a competitor's plant, my advice is, not to cut the price to offset this difference in freight, but to cut out the market, for, while you may lose in volume of sales, you will more than make up the loss by cutting down the selling expense and the variety.

The nearer a factory can come to making one thing, and then selling that one thing in a market or territory where the freight rates are favorable, the more certain will that factory be of profit and success.

If, either from factory conditions, lack of capital to meet

"long terms," or the location of the factory, as related to the market, a thorough knowledge of the cost develops the fact that a concern is unable to meet competition, my advice is to quit, and quit now!

Stop Losses or Quit Business

Liquidate the business with the least possible delay, get what you can out of the salvage, take the loss with a smile, and, equipped with the knowledge gained by bitter experience start all over again!

Don't go on losing your own, or some one's else money, in a game wherein you are at an uncontrollable disadvantage, for you can't win, and every day devoted to an effort to "keep a dying business going" is adding the handicap of age to your burden in starting life anew.

Any man who, knowingly, sells goods at less than cost, is committing a crime, for certainly when he loses money he is defrauding either his family, the stockholders of his own company, the people from whom he buys his supplies, or the banks that loan him money, and perhaps I may justly say he is defrauding all classes of people.

Stockholders or owners may stand for running the business at a loss, but I do not believe there are many people who care to sell their goods to a concern which they know is selling its product, or a considerable part of it, at less than cost, and it is an absolute certainty that as soon as the banker is advised of the particulars, the line of bank accommodations will be very promptly curtailed.

Right here is wherein a correct knowledge of manufacturing, and of conducting a manufacturing business, through association work and co-operation will make its longest stride toward correcting the abuses of price-cutting, elongated terms, and other evils.

I claim that we may very well discard altogether the discussion of selling prices if we have a thorough knowledge of the cost of our own goods, and a further knowledge of the fact that our cost, on the same product, is in line with what the cost is in the plants of our competitors.

If the members of this association will select from their number a small committee to take up the matter of cost of production, and if this committee so selected will conscientiously perform its duties, get up a set of specifications covering a few of the standard vehicles produced by the various factories, and will have a report compiled by certified public accountants, along the lines pursued by some of the members of the Wagon Association, I am satisfied that your association will have accomplished more toward benefiting your industry than it ever has since its organization.

As I see it, the same troubles confront you that confront the wagon manufacturers. Reports often reach us through our traveling salesmen and others, indicating that we are considerably out of line with our competitors, either in price, quality or grade, and perhaps all three. Frequently, these reports are sent in by a salesman who is "on the job," trying to induce a prospective customer to sign an order, and is waiting for a reply to the request, embodied in his report to you that he may be permitted to meet, or do a little better, than the offer made by the alleged competitor.

In thinking over what instructions to issue under such circumstances, we very naturally say to ourselves, "A is a very desirable customer, moves lots of goods, and is good pay, and if B can make him such an offer then we certainly can do as well, or better, by him," and we proceed to shade the proposition made the customer by the "other fellow."

If, instead of this line of thought and action, we could turn to our association files and get therefrom a compilation of costs, showing the costs, and then make a comparison between such costs and averages, with our own costs, how much more intelligently we could handle the situation!

If our costs were well in line with the costs and averages of others, and it necessitated our cutting our prices to a point where no fair return of profit would be given, or perhaps below cost, we could be more than reasonably certain that in making his offer to the customer (assuming that such offer had in reality been made) our competitor was selling his goods below cost.

With this knowledge before us we should decline the order, and comfort ourselves with the fact that in making this cut price, our competitor has established a price, which having made to one customer he would certainly have to make to all his other customers, or expect to lose their business, and that the further fact of his losing money on his sales would soon reach the attention of his stockholders, creditors or bankers, and he would thus eliminate himself as a competitor, and in the very shortest possible time.

Getting Grades Mixed

In competition with each other, I dare the assertion that in many instances the price of an "A" grade and a "C" grade job is confused. Many a man in the industry is today trying to make his "A" grade job compete with the "C" grade job, on which some "other fellow" is making an exceedingly low figure. If this is the case, stop it!

The cost reports through your association should readily and easily enable you to determine, by the quoted prices, whether your competitor was offering an "A," "B" or "C" grade job.

Your association is in a position to do a wonderful good in the way of educating its members by promulgating a campaign of cost education, and through such education, pointing out to such concerns as are unable to do a profitable business the desirability of retiring from the field before a financial collapse occurs.

The failure of any concern engaged in an industry, and the litigation following such failure, is hurtful to the industry as a whole, and to the concerns engaged in the industry individually, for the credit of everyone engaged in that line of business is bound to be more or less questioned by the banking fraternity.

Business, like every other natural thing, is undergoing evolution. Methods are changing just as everything in nature changes. The greatest change in the manufacturing business, as I see it, is the evolution in the conditions governing the marketing of the products, and I believe the natural law which says, "Evolution means the survival of the fittest," applies to business affairs as well as to anything else.

I claim that a hearty co-operative spirit, manifested through association work, helps a man more than any one thing else, in entitling him to be classified among the "fittest."

There is a book written by Mr. Arthur Jerome Eddy, and published by D. Appleton & Co., of New York, entitled "The New Competition," to which work I am very greatly indebted for many ideas relative to my business, and I believe that each and every man engaged in business should have a copy of this book and read it, not only once, but many times.

Chapter VI of "The New Competition" is devoted to the subject of "True vs. False Competition." In the opening of this chapter Mr. Eddy says: "Then your argument is that all competition should be suppressed?" Someone says, "No." "But if competition is war—" "Yes." "And war is hell—" "Yes." "Should not men stop competing?" "In a false way, yes; in a true way, no."

This, I think, is the keynote of the whole situation. Associations can not regulate selling prices, even if the law did not prohibit men getting together for the purpose of controlling prices and restraining trade, but there is cretainly no law against men in a certain industry getting together and discussing costs, along with other things connected with the industry, which would tend toward bettering the condition of those people who, either from choice or necessity, are giving their life work to that particular line of business.

FEATURES OF THE FRENCH SALON

Without revealing a very great deal that is startlingly new in design or construction, the fourteenth French Salon, which was opened in the Grand Palais in the Avenue des Champs Elysees, Paris, October 17, closed its doors October 27; it, however, served to make plain, among other things, that the changes that have been made abroad and that are being made, are no greater than those reflected by American practice; that the new cars are essentially the old cars refined.

The French builders seem to have struck a new note in body building, the most startling feature of which is the appearance of the so-called "boat" body, which appears to have caught on to an unusual degree abroad. In the various types of boat bodies the resemblance to floating conveyances does not stop with the appearance. It is carried deeply into the construction. Such bodies for the most part are built up of a number of "skins" of woodwork to resemble existing types of fast marine runabouts. The theory of such construction is that it reduces weight, while the lines conduce to a reduction of wind resistance. In at least one such body, the seats are removable and the "hull" is fitted with a cockpit coaming in regulation marine style. In another respect, the silhouette of the modern car has changed. Hoods slope more sharply and there is a well defined tendency to smooth down the sharp corners of radiators, though the V-type does not appear to be increasing.

Whatever else may be said for foreign tendencies in design it is certain that the six-cylinder motor has not gained in popularity in the slightest degree; the year is certainly not a six-cylinder year, as was freely predicted might be the case. If anything, the "six" has retrograded and the small, high-efficiency four-cylinder motor bids fair to very nearly boost it off the boards. In the popular sizes and even in the larger sizes, block casting has come more than ever to the front and for the main part valves are placed all on one side and are neatly enclosed. The most popular size motor would seem to be one with cylinders measuring about 80 x 150 mm., or roughly, 3⅛ x 5⅞ inches, making plain that the trend toward still greater stroke to bore ratios apparently has ceased for the time being at least. In constructional details, few motors depart from the conventional, the general attempt being to obtain compactness, simplicity and clean design—three features which long have been recognizable in American motors.

With regard to essential components, double ignition has almost entirely disappeared, the magneto being deemed sufficient for even the largest sized motors. In lubrication methods there has been a concerted attempt made to increase oil capacity. Some engines now carry as much as 2½ gallons of oil, which is maintained in constant circulation, and in a noteworthy number of cases manufacturers have attempted to facilitate cooling by casting fins on the bottoms of their crank cases. Another suggestive development is that under pans fast are disappearing. Pump and thermo-siphon cooling are about on a par, though the balance gives evidence of swinging in favor of mechanical circulation in the not far distant future.

They appear to be in no great hurry to embrace electrical equipment to anywhere near the extent it has been embraced in America. In a very few cases, makers are supplying electric lighting and engine starting apparatus as standard equipment, and in a few others they have indicated their intention of supplying it on demand.

Another feature of the foreign car in the abstract that is worthy of more than passing notice is the great preponderance of the Hele-Shaw clutch on Continental machines. British designers as a rule have not taken very kindly to the Hele-Shaw clutch, but across the channel there has been a veritable landslide toward it. The general impression seems to be that, weight for weight and size for size, the Hele-Shaw clutch provides for greater flexibility and smoothness than does the cone clutch or the usual type of disk or plate mechanism.

Brakes, as a rule, are considerably larger this year than ever before, and the general increase in size is taken by those in the know to indicate a previous and conspicuous failing that only now has been recognized. There has been no appreciable increase in the number of makers housing both pairs of brakes side by side in the same drums, and there has been no increase in the use of front wheel brakes.

In spring suspensions there probably has been more change than in any other single constructional detail. The transverse rear spring of the platform type has disappeared, though some makers still adhere to the single transverse semi-elliptic member. Likewise, the three-quarter elliptic rear suspension fast is giving way to the simpler semi-elliptic suspension incorporating long, flexible members. In one of the models on exhibition, the leaves are more than three inches in width, are extremely thin and are 60 inches in length, though this probably is the extreme. The tendency is toward thinner leaves and more of them. The designers of Clement-Bayard cars have adopted a rather unusual suspension in which the rear members are double cantilevers, one cantilever member being mounted directly above the other. A peculiar action which is claimed effectually to damp out oscillation and provide the maximum of resiliency results.

Contrary to what may be expressed as the general expectation, the worm drive has not made great strides during the past year; some few makers have taken it up in a tentative sort of way and others have dropped it. On the whole, it does not appear to have either advanced or retreated in the general affections of engineers; it has remained practically stationary.

QUEEN CITY CARRIAGE CO. TROUBLES

The Queen City Carriage Co., of Cincinnati, which was thrown into the hands of a receiver in the local Insolvency Court, was named as defendant in a petition in involuntary bankruptcy filed in the United States District Court by The B. F. Goodrich Co., Jason Schneider, doing business as The Empire Carriage Co., and The Post-Glover Electric Co.

The petitioning creditors' set forth in their petition that The Queen City Carriage Co. is indebted to them in the respective sums of $1,248.86, $229 and $3.35. It is alleged that the company is insolvent and that it committed acts of bankruptcy in that it transferred vehicles and parts thereof to a creditor named McHatton and was thrown into the hands of a receiver in the state court because of insolvency.

L. G. Robinson claims appointment of receiver was made without his consent, he being a judgment and general creditor; says the course was without authority.

PUBLISHER'S STATEMENT

Statement of the ownership, etc., of The Hub, published monthly at New York, N. Y., as required by the Act of Congress of August 24, 1912.

Name of	Post-office Address.
Editor, C. H. E. Redding,	24 Murray St., New York City.
Managing Editor, none.	
Business Manager, G. A. Tanner,	24 Murray St., New York City.
Publishers, Trade News Publishing Company,	24 Murray St., New York City.
Owners, Trade News Publishing Company,	24 Murray St., New York City.

(If a corporation, give names and addresses of stockholders holding 1 per cent. or more of total amount of stock.)

Joseph H. Wright, Broadway and 67th St., New York City.
G. A. Tanner, 24 Murray St., New York City.
Geo. W. Hills, Fairfield, Conn.

Known bondholders, mortgagees, and other security holders, holding 1 per cent. or more of total amount of bonds, mortgages, or other securities: None.

TRADE NEWS PUBLISHING CO.,
(Signed) G. A. Tanner,
Secretary and Treasurer.

Sworn to and subscribed before me this 16th day of October, 1913.
J. R. FRITH,
Notary Public.

Commission expires March 30, 1914.

WIND RESISTANCE

From the car and its external fittings the power absorbed by windage depends, and as the subject of proper body design is a wide one it will only be possible to mention very briefly a few facts.

The amount of power lost by wind resistance in a car depends upon the area exposed to the direction of motion, and to the lines of the car. Thus a landaulet car, with its larger normal area, offers a much greater resistance to the air than the torpedo touring car. In the case of a car traveling at 20 miles an hour, the actual opposing wind resistance that the engine has to overcome is about 1¼ lbs. for every square foot of normal area, and at 40 miles an hour it reaches the high figure of 6½ lbs. per square foot. Again, the wind resistance of a car with a pointed radiator and tapered bonnet is much less than in the case of a flat radiator and dashboard, although the exposed area is the same in each case.

The shape of the back part of the car is equally important, as a flat back portion is just as bad as a flat front side, and, consequently, a tapering extremity is greatly superior, as it allows the streamlines gradually to close in on the rear instead of creating violent eddies and regions of low pressure.

The windscreen must be included in these remarks, and for its most efficient use it should be as small as is consistent with the fulfillment of its object, and should be placed at an acute angle so as to divert the air streams instead of meeting them head on.

The accompanying photograph shows how the stream lines occur around an ordinary touring car traveling at speed. The effect of the wind screen in deflecting the air currents, represented by the white lines, is interesting, as is also the "dead water" region created behind it around the driver. The eddies induced in the back seating space are also instructive, but the most important effect, from the wind resistance point of view, is the great "wake," or region of low pressure and eddy currents, in the rear of the car. This region increases in length as the speed increases, and the smaller the area one can reduce this region to the lower will be the windage loss. This is effected by gradually tapering the back portion off, or rounding it off will prove rather better in practice than if left square.

The hood of a car naturally calls for consideration, and it might be mentioned that it should only be used where absolutely essential to comfort, as a very marked difference upon the power is caused by its use. The mud guards also should be as small and as graceful in lines as possible, and not, as one sometimes notices, of the aeroplane wing type. The semi-circular rounded, bicycle type of mud guard appears to offer the least wind resistance in practice, and is quite efficient in its action.

Finally the underbody of the car for least windage and cleanliness of the mechanism, etc., is best enclosed by a metal shield. The curved longitudinal underscreen, made so as to be easily detachable and secure, appears to be the most practicable form, but care should be exercised to see that it does not interfere with the cooling currents past the engine.

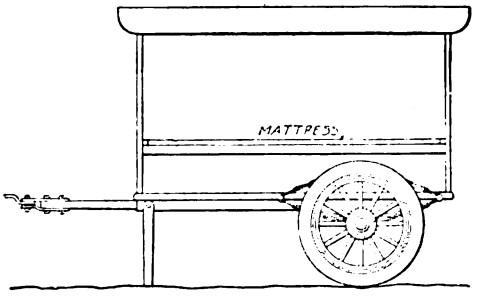
It has only been possible to touch upon just a few of the more important points worthy of attention. In some cases the question of convenience, cost, and trouble involved will tend to outweigh indirectly the advantages gained from the power point of view.

It is only by careful attention to the individual parts and factors involved that the ultimate efficiency of the car as a whole will be made as high and as enduring as possible, so it is hoped that the somewhat curtailed treatment of the majority of the individual causes may prove of utility and interest to those who seek to build for increased power.

TRAILER FOR AUTO

Automobile tourists in the west have adopted the method of carrying their supplies in a "tender" attached to the car. This is easily built and proves very convenient.

A type in common use is carried on two discarded motor wheels and is attached by link and pin to an iron bolted to the rear car frame. Below a bed consisting of a woven-spring



mattress is a compartment for carrying gasoline, a stove, a wide board to serve as table, and similar conveniences. It is fitted with a light canvas top with waterproof curtains. By means of an extension cord, the motor is made to furnish lights. Folding legs permit of the trailer's being left at camp during the day while the car is used to make side trips.

The use of such a tractor as a "base of supplies" offers possibilities in adaptation to the use of touring motorists.

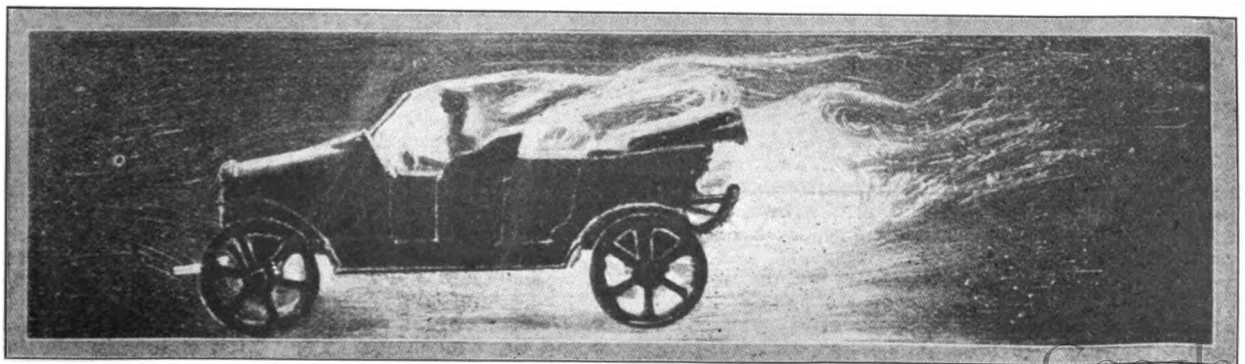
DEATH OF LAUREN M. FITCH

October twenty-first Lauren M. Fitch joined the majority. His death occurred at his home in Rome, N. Y.

We have had no time to await particulars, but hope to speak of the life and trade activities in a succeeding Hub.

Mr. Fitch was one of the familiar of the trade. His personality was so genial, and he had been so long identified with the making of gears and components, and had been so activity in personally introducing their merits that he was uncommonly well known personally, for a head of the business.

We have seldom known a finer, more upright business man, or one of broader sympathies. We sincerely present our sympathy to his widow, who, we are informed, will continue the business of The Fitch Gear Co., as she is so well capable of doing, owing to a long and diligent business training with her late husband.

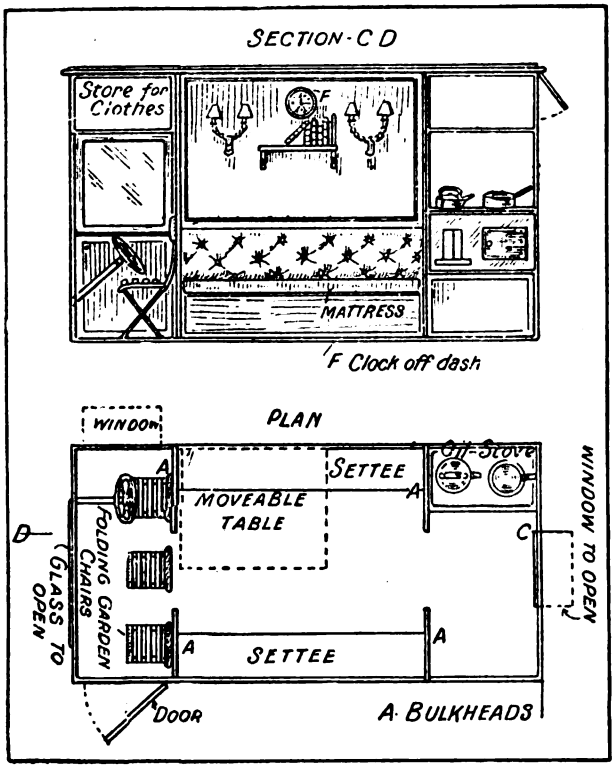


DESCRIPTION OF A TOUR ON A MOTOR CARAVAN

The Chalet was entirely home made, the body being built in a disused coach house, and when complete being lifted on to the chassis of our landaulet. It was arranged to sleep four people—two adults and two children, but on the outward journey we carried five, writes Grace A. Lomax, in describing a journey in a caravan. Rough sketches show the arrangement of the interior.

The caravan body was no heavier than the usual closed body, and we were able to make good speed on the road. While traveling we sat on comfortable garden chairs in the front division, which had large side windows to open. This room was fitted with green serge curtains for the night time, and was separated from the living room of the van by the same means.

We slept in the center floor space on a pair of lath spring mattresses (also home made) resting on chairs at either end, and covered with a small hair mattress. This bedding, together



with the necessary blankets, etc., was stowed away during the day at the back of, and on, the wide settees, and covered entirely with green serge covers. We had a good sized table here also in one corner, which was easily removed for convenience in getting into bed.

Behind the living room was my special compartment, the kitchen. Each side was fitted with lockers and shelves. On one was the cooking stove. The great secret with a paraffin stove is strict attention to cleanliness. Above and beneath the partition for the stove, which space was entirely lined with metal in order to guard against fire, were divisions for saucepans, kettle, oil, wash-up, dustpan, etc. On the opposite side at the top was a most ingeniously contrived larder, with an opening to the outer air; below this, shelves and fitments safely to carry stores and enamel ware. A good window to open at the back, with a small ledge table under, gave us thorough ventilation. Over the driving room was a large space, which was fitted with two light, long, sliding boxes, and these were used as our wardrobe and library. Interior lighting was by means of candles in double sconces, but we will have electric next time.

We left London stocked with week-end provisions, but as we were late in getting away, and wanted to leave home some distance behind before nightfall, we had tea at a wayside cottage en route. We reached Maidenhead after dark.

We found absolute honesty in the country, being able to leave the van for hours with spare tires, etc., strapped on, and finding all intact on our return. Our daily plan was to move camp shortly before midday. We called a halt for dinner at one, or as near that hour as possible. This would last until about three, as there was clearing up to be done and a cup of tea to be enjoyed. We then drove again until tea time, which meal we sometimes partook of on the road, and at others waited for it until we were camped for the night. As evening drew on the pilot kept an eye open for a likely camping field, and only on one occasion were we refused permission to enter the chosen field, and only once were we charged for doing so. We lived very simply, eating a plentiful supply of stewed fruit, cold meat, etc. We found the country bread very delicious, as was also some I baked in the oven of the oil stove. Of course, when staying for some time in one camp, I was able to indulge in a little cooking, and excellently it turned out, though the process seemed slow after a large gas cooker.

The days slipped by until on Thursday we found ourselves over the Devon boundary. Torquay was our goal. The road menders shared the joy which we felt, for they cheered and waved their caps as we passed. It was nearly dark when we mounted the hill above Teignmouth, after crossing the bridge at Shaldon, and so we lighted the lamps and glided down into St. Mary Church (our haven), and came to rest by the statue at the end of Fore street. Here we were soon sighted by friends, who had received no tidings for two days, and who, never having seen the Chalet, were filled with curiosity.

We tried to get down a lane to a field close by, but got tightly wedged between unyielding hedges of granite, so being in no one's way, and being very hungry and tired, we settled to a hearty tea and bed, choosing, much to our people's amazement, to sleep on board instead of in a house.

We spent a never-to-be-forgotten week in a field overlooking Babbacombe Bay. We were very much at home here, and indulged in a clothes line and a washing day, and even had a postal address at which our letters were delivered.

Well, all good things come to an end, and we bade farewell to St. Mary Church and took to the open road once more.

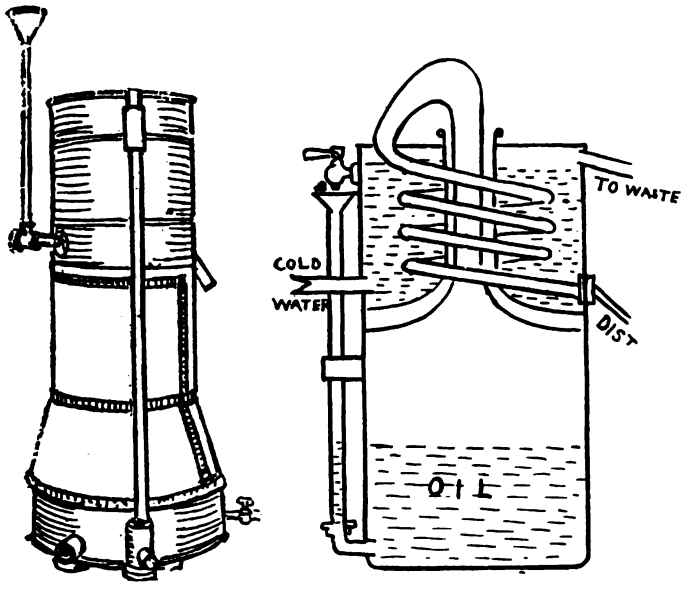
Bath proved very interesting after a quiet week-end at Taunton, and several days were spent in exploring the ancient city. Our camp was at the foot of the hill outside the town, and it was a nightly pleasure to watch the twinkling lights which dot the slopes like glow worms.

Our next pitch was at Reading, and then our motor seemed to smell his stable, or we to think of home, for we decided that anywhere between Reading and London was too towny for a camp. Tea time saw us at Woodford, and our predominant feeling on entering the house was how ridiculous it was to have so many rooms and so much work, when one could carry one's house on one's back, so to speak. I was homesick on that and on many succeeding nights for my cosy little van, which had come to be a home indeed during the three weeks we spent in her. Our day dream since is always another caravan, rather larger, but very little heavier, for one can do wonders with a van of that size, while anything heavier must be a cumbersome affair, and very extravagant to run as regards fuel and tires.

To those who object to the old method of thoroughly greasing their hands in order to make subsequent cleaning easy after an overhauling job, for instance, it is recommended that a solution composed of four parts of alcohol, three parts of glycerine and three parts of water be used instead. This should be well rubbed in and the hands permitted to dry before work is commenced.

STILL TO MAKE HOME MADE MOTOR FUEL

The high cost of gasoline, or petrol, as it is styled in England and on the Continent, has been directly productive of several proposed substitutes; it has stimulated the efforts of inventors to perfect some sort of a device or mechanism that will make possible the use of kerosene; and now it has been responsible for the development of a pocket-size still with which the motorist can make his own gasoline. With it, it



is said, any one can readily convert four gallons of crude oil into 3½ gallons of perfectly good motor fuel in two hours. Two views of the apparatus in its entirety are shown herewith, the part sectional drawing showing the construction of the device. The crude oil is placed in the lower receptacle and the burner beneath it, which may be operated with either crude oil, gasoline, kerosene or gas, then is lighted.

Thereafter the operation of the still is automatic, no further attention being required.

GOLDEN WEDDING

Surrounded by their children and grandchildren, Mr. and Mrs. Daniel D. Scott quietly observed the fiftieth anniversary of their marriage at their home, 848 Adams street, Dorchester, Mass. Mr. Scott for nearly two score years has been in the carriage manufacturing business on River street, Lower mills. Mr. Scott is 72 years of age and Mrs. Scott is in her 70th year.

A pleasant feature of the anniversary was the presence of Mr. Scott's only brother, James B. Scott, who is 80 years of age, but who with his wife journeyed to Boston from Bloomington, Ill., to be present at the golden wedding.

OVER QUEENSBORO BRIDGE WAY

The Plaza, as eastern (Brooklyn) approach to Queensboro bridge in New York is called, is having a great vehicle boom. The following are there now: The General Vehicle Co. is investing $5,000,000, the Ford Automobile Co. one million, the Pierce-Arrow Co. $400,000, the Goodyear Rubber Tire Co. $400,000.

ECHO OF MICHIGAN BUGGY MIX-UP

Orville E. Short, of New York City, dealer in carriages and automobiles, has filed a petition in bankruptcy, with liabilities $65,280 and assets $25,039. The Michigan Buggy Co., of Kalamazoo, is a creditor for $26,704, and there are also notes made by Mr. Short amounting to $31,857 to that company which have been discounted by the company and the holders now are unknown. The company also appears in the outstanding accounts as a debtor to Mr. Short for $17,000. Mr. Short has been in business for 21 years, is interested in several companies, and is president of the Auto Body and Taxicab Co.

CHARGE XENIA FIRM IS BANKRUPT

A petition in involuntary bankruptcy was filed in the United States District Court by the Smith Bros. Hardware Co., the Leonard Gates Co. and the Peters Buggy Co., of Columbus, O., and the Rathbone Sard Co., of Aurora, Ill., against William Race and William Glossinger, doing business at Xenia, O., as hardware and implement dealers under the firm name of Racer & Glossinger.

NEW ORLEANS WAGON MAKERS

The Carriage and Wagon Makers' Association has been organized and chartered. The idea is to promote friendlier business relations in the trade. The members are the Philip Forsch Wagon Mfg. Co., Dixie Vehicle Co., O'Connor Co., Ltd., Oster Brothers, William Thiell, George Springer, Seidel Grosz Mfg. Co., Frank A. Briede, Frank Brinker and William E. Hogue.

WALKER CARRIAGE CO. REORGANIZES

A meeting of the officials of the Walker Carriage Co. was held in Merrimac, Mass. A thorough reorganization has been effected. An important feature of the session was the admission into the firm of Frank M. Prescott, who has been employed in one of the departments for several years. There will be no change in the policy of the firm. Ex-senator James H. Walker is the head of the company.

PRACTICAL PLANNING FOR THE CANAL

The West Penn Steel Co., of Pittsburgh, which has been supplying steel to the automobile manufacturers of San Francisco and other Pacific coast cities, has been ordered to send the material from Pittsburgh by way of the Panama Canal as soon as possible. The first shipment to go in this way will most likely be early in 1914. It will be limited only by the amount the steamer can handle.

OPEN PLATE SPRINGS

A Manchester (Eng.) concern specializes in the manufacture of springs particularly suited for the suspension of commercial vehicles. The range of springs consists of a set constructed to carry 300 lbs., right up to springs capable of carrying five tons. The principal spring, however, is the patent Cary open-

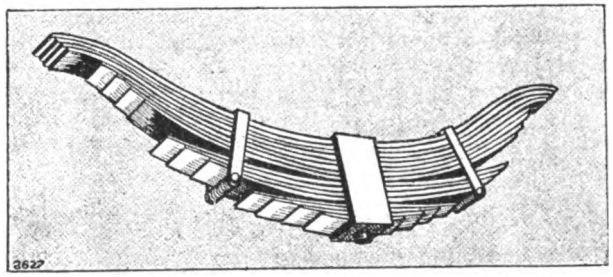
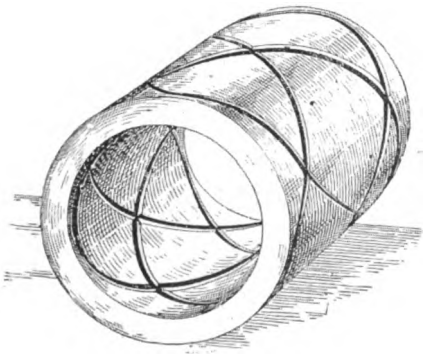


plate type of road spring, so constructed that the body of a vehicle, when empty, is carried upon a top set of plates. When the load is imposed, another set of plates is utilized, and should the machine when running negotiate any obstacle on the road a damping effect is obtained through a third set which comes into use. We illustrate this type of spring.

REVOLVING SLEEVE FOR BEARINGS

Recently I made a sleeve bearing or bushing grooved on both inside and outside circumferences, says T. H. Delaney, in Power. These grooves are to distribute the lubricant equally on all the surface of the bearing. These grooves are all of uniform pitch and the work was done in a common lathe with a turning tool. It might be interesting to some and of benefit



to others, who might want to use such a sleeve on close-fitting valve-stem bearings or on loose pulleys. On any high-speed bearing it is exceptionally good and ought to prevent or overcome serious friction troubles and losses.

BEST YEAR

The Emerson-Brantingham plants had the best year in their history, according to information given out by the offcials. The fiscal year closed August 1, and the report for the year has just been made up. It was said the agricutlural implement and the carriage shops showed the greatest increases, their business exceeding that of previous years by 25 per cent.

BOOST CINCINNATI

The growth of Cincinnati and the necessity for a better exploitation of her products to visitors was the subject of an address made by President Luke W. Smith, of the Manufacturers' Permanent Exhibit Building, to the members of the Cincinnati Carriage Makers' Club, at the Business Men's Club.

SMITH HARDWARE TO BUILD A NEW PLANT

The Jos. N. Smith Co., of Detroit, which manufactures automobile hardware, has purchased a site for a new plant in that city on St. Antoin street between Hendrie and Farmer avenues. It includes approximately half a block and is valued at about $20,000.

SUPERINTENDENT GOING INTO BUSINESS

Superintendent Myrtle, of the DeKalb (Ill.) Wagon Co., has resigned his position and within a short time will go into business with a relative. Mr. Myrtle is in charge of the wagon department.

UNDER WATER AND OUT

The flood in Calcasieu River submerged the Lake Charles (La.) Carriage and Implement Co. They are feeling better now. Water down and damage $1,000.

FIRST TIME IN SEVENTEEN YEARS

The John Deere Wagon Co. drew boiler fires the other day for the first time as stated above. All hands took a rest while repairs were undertaken.

THE BIAUTOGO

James Scripps Booth, of Detroit, several years ago set out to design something propelled by a gasoline engine which would be out of the ordinary. The idea of developing a strange vehicle which Mr. Booth has christened the Biautogo long ago was held by him, the first sketches being dated at Paris about three years ago.

The Biautogo was not developed primarily with the idea of placing the vehicle on the market for general sale; however, the vehicle has since been completed in excellent style and presents a most finished appearance throughout. At first glance, even the veteran automobilist who can spot any model of any make of car will be at a loss to tell just what he is looking at.

The Biautogo is a machine mounted upon two large wheels and has two smaller balance wheels on the sides which are pressed into service at low speeds. When traveling above 20 miles per hour these small side wheels may be raised, when the car balances on its two main wheels just as a motor cycle or bicycle balances.

The seating capacity is three persons—the driver sitting forward of the main double seat. This driver's chair is hinged to swing forward to admit the rear seat passengers. The steering wheel passes through the dash board on which the various gauges are attached. The wheel is in the center as are the control levers, the driver sitting astride of them. The control is standard with the exception that the clutch and service brake pedals are in reverse position as compared with the conventional car, the clutch being to the right of the brake pedal. Besides the regular brake and gearshift levers, there is a third lever which operates the side balance wheels, an eccentric mechanism making it possible to raise them about four inches.

The motor is an eight-cylinder, V-constructed block-cast type, designed throughout by Mr. Booth and having a horsepower of about 45 with 3¼ x 5-inch cylinders.

TO INCREASE THE LIFE OF A HACKSAW

Many mechanics have doubtless noticed that when one tooth of a hacksaw blade is broken out, the teeth next to it will soon break, and that the blade will not last long after one tooth has failed. This condition is particularly noticeable when sawing rather thin sheet metal or starting on the corner of a heavier piece of work; the latter cause of breaking blades might easily be avoided by setting the work up so that the saw will not start on the corner. When one or two teeth on a sawblade are broken it is a good plan to grind down the adjacent teeth on each side of the gap, graduating them. This does away with the sudden jerk which occurs when the gap caused by a broken tooth allows the saw to drop down over a sharp corner or the edge of a thin piece of work; hence, the tendency to "dig in" or "bite" is eliminated, together with the tendency for the uneven action of the blade.

ROCKED TO COMFORT

The office and working force of the Tiffin (O.) Wagon Works Co. have given a rocking chair to Col. J. E. Hershberger, a valued associate.

STEEL WAGON TONGUE

The Hall Mfg. Co., of Monticello, Ia., is making a steel wagon tongue, the invention of a Mr. Hanson.

ANOTHER GONE

A receiver has been appointed for the Mason Motor Co., of Waterloo, Ia., according to The Capital.

Trade News From Near and Far

BUSINESS CHANGES

W. A. Price has disposed of his stock of vehicles, etc., in Dixon, Neb.

C. J. Kallman has disposed of his business in Rexford, Kas., to A. E. B. Neligh.

Wm. Lell has sold out his stock of vehicles and implements in Chambers, Neb.

J. R. Bozarth has purchased the business of Sherrick & Co., in Centerview, Mo.

B. Yoder has purchased the stock of vehicles, etc., of H. H. Rankin, in Ravenna, Neb.

The Tiede Implement Co. has purchased the Bricker stock of vehicles in Russell, Kas.

John Rasmussen has purchased the stock of vehicles, etc., of C. Liebum, in Orleans, Mich.

Doyle Bros. have purchased the Else stock of vehicles and implements in Lebanon, S. D.

Siebel & Schone have succeeded to the business of Siebel & Herren, in Monticello, Iowa.

J. O. Johnson has purchased the stock of vehicles, etc., of Paul H. Graves, in Gruyer, Ia.

B. O. Stone has sold out his vehicle business in Abilene, Kas., to S. E. Pugh, of Clay Center, Kas.

J. D. Martin has purchased the stock of vehicles, etc., of David Young, in Cedar Bluffs, Neb.

C. G. Trant has purchased the stock of buggies, etc., of S. D. Swayne, in Guthrie Center, Iowa.

W. H. Margritz & Son have purchased the stock of wagons, etc., of Herbert Bros., in Ravenna, Neb.

The Hawkeye Buggy & Implement Co. has purchased the business of H. C. Klingman, in Des Moines, Ia.

Wm. Thompson has sold his hardware business in Oketo, Kas., but will continue to handle buggies, etc.

DeMots & Duistermas have purchased the vehicle and implement business of W. H. Beacom, in Sheldon, Ia.

Edward Frost has disposed of his stock of buggies, etc., in Central City, Ky., to the Wallace Hardware Co.

The Gage County Implement Co. has purchased the stock of vehicles, etc., of C. G. Ernst, in Beatrice, Neb.

Schrepher & Young have purchased the vehicle and hardware business of Richard Dodsworth, in Mt. Hamill, Ia.

A. A. Johnson has been succeeded in the buggy and implement business in Elmwood, Neb., by M. L. Golalher.

F. S. Griffith has purchased the stock of vehicles, etc., from C. E. Ghormley, in Pensacola, Okla., and John Archer is in charge.

NEW FIRMS AND INCORPORATIONS

A. Frost & Son have engaged in the vehicle business in Cassville, Mo.

F. C. Moenke is putting in a stock of vehicles and implements in Cecil, Wis.

Swaffer Bros. are opening a new stock of vehicles, etc., in Lehigh, Okla.

G. D. Sleeper and others propose to put in a wagon factory in Muskogee, Okla.

John Gaughan has opened a new stock of vehicles and implements in Earlton, Kas.

J. N. Smith has engaged in the vehicle and implement business in Frankfort, Kas.

C. L. Engle has engaged in the vehicle and implement business in Anadarko, Okla.

The Macclenny Hardware Co., of Macclenny, Fla., is adding a line of buggies and wagons.

Ingham & Prose have purchased the stock of buggies, etc., of Young & Kibler, in Woodbine, Ia.

Herman Henstenberg is opening a stock of buggies, etc., in the Sassman building, in Owensville, Mo.

The Parlor City Carriage Works has been organized in Cedar Rapids, Ia., and is erecting a $4,000 home.

Clifford Williams, of Spring Hill, Kas., has engaged in the vehicle and hardware business in Wakefield, Kas.

Hager & Van Verth, of Bendena, Kas, have engaged in the carriage and implement business in Hiawatha, Kas.

The Antelope Valley Implement Co. has been incorporated in Los Angeles, Cal., with a capital of $25,000, and will handle vehicles.

The Central Wagon and Auto Co., Cleveland, O.; wagons and automobiles, etc.; $10,000; has been incorporated by Steve Cordas, H. D. Squires, Harvey G. Keck, M. T. Gardner, R. O. Carver.

IMPROVEMENTS AND EXTENSIONS

A. L. Fletcher is about to erect a new vehicle store in Dixon Bay, Neb.

C. A. Edwards is about to erect a new vehicle and implement store in Salem, Ia.

An addition is being built to the store building of Lane & Wilson, in Cle Elum, Wash.

A new addition to the Sweitzer carriage works at Martin's Ferry, W. Va., has been completed.

A 20 x 40 addition is being put up by Peter J. Miller to his wagon and blacksmith shop at Clinton, Ia.

Lew Haefner has begun the erection of a new building to house his stock of vehicles, etc., in Bainville, Mont.

The Stoughton (Wis.) Wagon Co. has installed a new 150 horsepower boiler for use in its power plant. The smoke stack for the new boiler is four feet in diameter and 60 feet high.

The McRary Company, with W. S. McRary manager, has taken over the bankrupt stock of J. C. Wallace, at Asheville, N. C., and will enlarge the plant, making a specialty of building wagons to order. New machinery has been purchased for the plant, which will be conducted as a modern wagon repair and blacksmith shop.

A three-story building to cover a lot having a frontage of 150 feet on Avenue C, 140 feet on Third street and extending back to a twenty-foot alley, will be erected for the Woodward Carriage Co., at San Antonio, Tex. This is made necessary by the growth of the business. The structure will cost $100,000. There will be a basement, giving the use of four floors or a total floor space of 96,000 square feet.

The Hercules Buggy Co. is having plans drawn for a three-story addition to the Hercules plant. The building will be of brick, 90 x 175 feet in dimension. The new building will add 20 per cent. to the previous capacity of the plant which is 75,000 buggies a year. The plant is now employing 2,000. In the new addition to the Hercules buggy plant the office force for all the Hercules industries will be housed.

Theodore Thompson's carriage works at Boone, Ia., has just put on an addition which is larger than the original plant. The lower floor will be used for a paint shop, storage and general

carriage room, while the upper floor will be devoted to rink purposes in winter and to storage and buggy purposes in summer. The building is strictly modern throughout, lights, plumbing, ventilation, etc. The estimated cost of this improvement is $6,000.

Extensive improvements at the plant of the Middletown (Pa.) Carriage Works are under way. A new 50 horse power engine is being installed, new and improved woodworking machinery has been ordered and an extension has been built to the factory. The floors of this extension will be of reinforced concrete and the factory will be equipped with fire escapes. According to H. R. Bauder, manager of the wagon works, they will cost several thousand dollars.

A new stone addition to the Hess Carriage Works at Hagerstown, Md., just completed, adds greatly to the facilities of the plant. The building, which is 48 x 102, and two stories high, will be used for storage, and its erection is due to the growth of the business of the concern. So far this year the Hess Carriage Co. has turned out 950 vehicles but it expects to do a much larger business next year and is preparing to manufacture a yearly output of 2,000 vehicles. Thirty-five men are now employed, but this number will be increased.

FIRES

The stock of vehicles of Carl McPrang, in Stamford, Neb., has been burned.

The stock of wagons of Thompson Bros., in Harlan, Ia., has been destroyed by fire.

T. C. Martin, the carriage dealer of Pullman, Wash., has sustained a partial fire loss, which was covered by insurance.

The stock of vehicles, etc., of the Roberts Hardware & Implement Co., in Rexburg, Idaho, has been damaged by fire.

An explosion, apparently of 16 gallons of gasoline, wrecked the carriage factory of Clarence Hilderbrand, at Terre Haute, Ind.

Fifty thousand dollars damage was done by fire and water to the automobile body and wagon factory of G. A. Schnabel & Sons, at 3959-3961 Penn avenue, Pittsburgh, Pa., October 23. Walter Schnable, one of the firm, estimated the damage at $50,000.

AUTOMOBILIA

The Ford Company is installing a salesroom in Norfolk, Va.

American Motor Truck Co., Detroit, Mich., incorporated; capital $5,000.

V. E. Peterson is opening a new automobile business in Chadron, Neb.

Sterling Detroit Motor Co., Detroit, Mich., incorporated; capital $105,000.

Geil & Taylor are engaging in the automobile business in Elk Creek, Neb.

John E. Weisner has engaged in the automobile business in West Point, Neb.

Johnson & Williams are about to engage in the automobile business in Wayne, Neb.

The Ideal Motor Co. has been incorporated in Hopkinsville Ky., with a capital stock of $4,000.

The White Motor Co. has been incorporated in Richmond, Va., with a capital stock of $25,000.

The Flyer Motor Car Co. has been incorporated in Detroit, Mich., with a capital stock of $100,000.

The Gaskill Automobile Co., of Nebraska City., Neb., is about to put in a stock of automobile supplies.

The Cask Automobile Co. has been incorporated in Darlington, S. C., with a capital stock of $1,000.

The Southern Motor Car Co. has been incorporated in St. Louis, Mo., with a capital stock of $5,000.

The Bond Automobile Co. has been incorporated in St. Louis, Mo., with a capital stock of $10,000.

The A. P. Mitchell Auto Co. has been incorporated in Fort Worth, Tex., with a capital stock of $15,000.

The Frankfort Motor Car Co. has been incorporated in Frankfort, Ky., with a capital stock of $3,000.

The Texas Motor Truck Co. has been incorporated in San Antonio, Tex., with a capital stock of $10,000.

Grand Center Motor Car Co., Joseph, Mo., incorporated capital $5,000; incorporators, Eugene Rosenbleet, M. J. Handler, M. Reich, H. R. Lewis.

Warm-Hand Steering Wheel Corporation, of Poughkeepsie, N. Y.; $150,000; Grant E. Smith, Walter S. Barton, and Josiah C. Barton, 1324 Seventy-third street, Brooklyn.

The Sterling Spring Co., Cleveland, O.; manufacture of auto springs; capital $150,000; Fred C. Wood, E. D. Lindersmith, D. P. Osborne, Henry F. Ehlert and John A. Flajole.

The Stephenson Motor Truck Co., of Milwaukee, has been thrown into bankruptcy by three outside creditors, who say that the concern admitted its inability to meet obligations and consented to bankruptcy.

Stockholders of the Packard Motor Car Co. took action that capital stock be increased from $10,000,000 to $16,000,000. It is probable that $2,000,000 par value of the new common stock will be distributed as a stock dividend.

Rollin W. Warner, of Muncie, was appointed receiver of the Interstate Automobile Co., of that city. Warner will succeed Michael Broderick, who was appointed receiver. The petition for a judgment of bankruptcy and appointment of a receiver was made by Margaret Jenks, of Port Huron, and a number of other large creditors, including several Muncie concerns.

It has been announced that J. A. Vail, for the past eight years general manager of the Fairbanks-Morse Mfg. Co., Beloit Wis., has been elected to and has accepted the position of chairman of the executive board of the Maxwell Motor Co. with headquarters at 54 Wall street, New York City. W. S. Hovey has been appointed general manager, and George B. Ingersoll, assistant general manager, of the Fairbanks-Morse plant.

The Lewis Motor Co., Racine, Wis., is the name under which a new automobile concern will transact business. The officers will be William M. Lewis, president; E. B. Hand, vice-president; Rene M. Petard, secretary and treasurer. The capital stock of the company has been placed at $250,000. The company will occupy a large space in the old Racine-Sattley plant at Racine Junction. They will manufacture the automobile designed by Rene M. Petard, who was formerly connected with the Mitchell-Lewis Motor Co.

Minneapolis capitalists with $6,000,000 to back the enterprise, have organized the Standard Motor Co. They will acquire the plant of the Minneapolis Motor Co. and the Colby Motor Co., of Mason City, Ia., and will build in Minneapolis the largest automobile manufacturing plant in the west. The company plans for a $3,000,000 plant to make pleasure and light delivery cars. Among those interested in the project are F. E. Kenaston, president Minneapolis Threshing Machine Co., M. J. Scanlon, of the Scanlon-Gipson Lumber Co.; S. H. Bowman, of the Bowman Lumber Co., and P. M. Starnes, vice-president of the American Timber Holding Co.

A new automobile factory is to be promoted and financed by Nashville capitalists. The Evans Motor Car Co. is to be situated on the eastern banks of the Cumberland River. The new plant will be one of the best equipped automobile factories in the country and will give employment to between five and six hundred mechanics. The plans calls for the erection of three concrete buildings, each 50 x 300 feet. The site of the factory is about five miles from Nashville on the Gallatin Interurban Railroad. The officers of the new company will be comprised of Nashville men, and practically all of the stock will be held locally, and from every indication the project promises to be very successful. Mr. Evans, the secretary of the firm, has long been identified with the automobile industry and understands the manufacture of the motor car from the

ground up. He has successfully started several factories in Detroit, Mich., and other places, and has now turned his attention to the south. A. P. Foster, president of the Nashville Industrial Bureau, is president of the company.

ROAD NOTES—PENNSYLVANIA

Scranton—The carriage repair work is quite good, but there are no large carriage or wagon manufacturing plants. The bad roads and hills make it bad for the automobiles for delivery service. The trade in various lines has been a little dull, owing partly to the men on strike at various coal mines. Better prices ought to be obtained for the wagons sold. There is trouble here with the men working in the wagon shops. A branch of the International Carriage and Wagon Makers' Union was organized here. They have demanded of the employers that they recognize the union, put a union albel on what is made, pay minimum wages of $3 per man for woodworkers, blacksmiths, painters and trimmers. The union asks to examine the employer's books, papers, bills, etc.; for a nine hour day, one and one-half time pay for overtime, and supper bought when working overtime. The employers would also have to join the union and those not already members would have to pay $100 to join. The majority of the employers are not in, and refuse to join. They also refuse dictation, etc. Most all the shops pay union wages, but refuse dictation. Two-thirds of the journeymen are not in favor of the organization. This local has affiliated with the national organization. The teamsters have organized and will not run a wagon without a union label on. This has kept down orders.

J. J. Hanley, of Linden avenue, has started in the business of painting carriages, wagons, and automobiles.

The Altemose carriage and wagon works, 1227 North Washington avenue, says the unions are trying to put them on the unfair list, but have not succeeded. The union has been trying to force them to join. They expect to build a new shop to cost $6,000, to make a general line of delivery and truck wagons.

Pat Gordon and O. R. Gould joined the union early.

H. G. Smith & Bro. pay union wages, work the men union hours, and pay the men every week, but will not join the union. They are also building auto tops.

S. B. Hills, of 520 Ash street, handles the Weber wagons and also farm machinery.

The Standard Top Co., 1129 Caponse avenue, is making carriage and automobile tops. The output is larger than before. D. A. Backus tours Pennsylvania and southern New York, and attends automobile shows.

The Gilhool Wagon Co. has moved its plant from the west side to 1227 North Washington avenue. Been in business since 1870. Giving attention to wagon work and automobile painting.

The Bittenbender Co. says wagon manufacturers find it almost impossible to get iron and steel, as there is a general shortage of wagon tires, etc. At least 50 per cent. of the wagon manufacturers in this section have also gone into the automobile line and there is much remodeling of automobile bodies and painting. There has been a general increase of 25 per cent. in prices of shafts, poles, hubs, etc. Eight or nine years ago this firm did exclusively a wagon and blacksmith material jobbing trade, but today this is the smallest part of the business.

Wilkes-Barre—S. Y. Culver, of 232 Carey avenue, makes a specialty of birch for wagon hubs, and second growth hickory for tongues. He says ash is short and getting scarce.

Mr. Kemmerer, of the Bittenbender Co., got back from attending a meeting of the jobbers in New York City, and the general impression is that this year will be a good one. All small goods, such as bolts, nuts, washers, etc., are scarce, and wagon manufacturers can not get these fast enough.

It is reported that A. R. Gould, wagon manufacturer, will also get into the automobile truck line.

H. G. Smith & Bro., wagon manufacturers, have bought the hame factory of A. D .Williams, 443 Taylor avenue.

E. B. Houser, of 133 North Main avenue, has been handling carriages, but is dropping out of the line.

The Goodyear Tire & Rubber Co., of Akron, O., has opened a branch at 324 North Washington avenue, in charge of W. S. Boone.

William Bright, of 1716 North Main avenue, has a large plant and one of the best for manufacturing carriages and wagons. He is busy. Does not go in for automobile work except painting. Going out of the retail carriage and wagon business and confine attention to manufacturing.

Monroe Brown, of 1358 North Main avenue, represents the H. A. Moyer wagons of Syracuse, N. Y.

Mr. Hall, of the Scranton Axle & Spring Co., says they are running in their new location. With a smaller force are able to produce a greater volume of work per employe by good planning. The plant has its own electric lighting and power. Are planning to put on the market in the near future a special axle, with pressed steel box, which will be strictly interchangeable and present the good features obtained in a wrought iron box, together with this idea, interchangeability. Orders from the carriage and wagon trade are larger this year than ever. The spring department runs night and day for both wagons and automobiles, but the axles are made only for the carriage and wagon lines. Are contemplating the erection of a foundry 100 x 50 feet in size, to make their own boxes for the axles. The cost of this building will be $20,000.

Harrisburg—While the demand for light carriages is slow the call for express, delivery and truck wagons is good.

F. N. Watts (the Watts Wagon & Automobile Co.) moved from 28 North Cameron street to 1017 Market street. Make automobile bodies and wagons. Have a larger and better plant than ever before. Mr. Watts used to be in business alone but has incorporated this company, with a capital stock of $5,000. F. N. Watts is president and manager, A. K. Watts secretary and treasurer. Will also handle for this section the wagons made by the Columbia (Pa.) Wagon Co. and John Gutelius, of Mifflinburg, who makes a light wagon.

H. C. Hill, of Thirteenth and Market streets, is on the road most of the time selling carriages and wagons for the Ligonier (Pa.) Carriage Co.

A. F. Newcomber, of 227 South Thirteenth street, who was for years with the Milburn Wagon Co., is now selling for the Brown Mfg. Co., of Zanesville, O., who make wagons and farm implements. He has also obtained the line of the Lull Carriage Co., of Kalamazoo. Mr. Newcomber travels through eastern Pennsylvania, Maryland and Delaware.

The Emerson-Brantingham Implement Co., successors to the Geyser Mfg. Co., will make this a distributing point for the wagons made at Waynesboro, Pa., and other points.

The United Ice, Coal and Lumber Co. has its own wagon shop, in charge of John Bubbs.

A. Redmond, of 1500 North Third street, a large manufacturer of carriages and wagons, says the commercial carriage business is about done, that the delivery wagon is rapidly being displaced by motor trucks. Mr. Redmond will continue his wagon and carriage shop where he employs eight or nine men. Has erected a new building to sell his line of automobiles.

J. W. Dill, of Mulberry street, is handling the Inter-state cars, and is also in the carriage line.

C. O. Sefton, who conducted the Sefton carriage works at 1203 Capitol street, was killed about a year ago in an automobile accident. H. C. Frank, of Newport, Pa., came here to manage the plant. He has been making principally automobile tops and general repairs.

Since C. E. Shaffer died about a year ago the wagon building business at 28 North Cameron street has been conducted as the C. E. Shaffer estate, managed by the son.

The old firm of Snyder & Kahler, manufacturers of carriages and buggies at Newport, Pa., has made a change. W. H. and J. Wesley Snyder now conduct it as Snyder Bros. Carriage Co. They worked for the old firm.

Williamsport—The carriage business is not what it used to be, although there is occasionally some demand. There is still demand from the heavy trucking lines and farmers for heavy wagons.

Henry Veil, of 748 West Fourth street, who used to do the big high grade vehicle business here, is still handling carriages and wagons and has also put in a line of agricultural implements.

There was something new on wheels in this city that I never saw in my travels before. That is the market houses on wheels. Many men in the city have these market houses, also many farmers come in them as far out as 15 or 20 miles. It is like a house on wheels and is nothing like a push cart or huckster's wagon. It is covered, has a store and cooking utensils, is placed on two wheels and pulled by a horse. These market houses cost from $50 to $100 to build and there are about 100 of them in use in this city.

Edward S. Fleming is conducting the carriage business of S. W. Rhen, at 772 West Edwin street, for the widow, Mr. Rhen having been dead several years.

E. C. Rhen, of 427 West Third street, who used to make carriages and wagons, has not made any now for several years, but paints them.

C. Gohl, of 282 West Third street, is building some automobile bodies and does considerable repair work. Also has some delivery wagons to build but does not have any carriage business now. There is no demand for Germantowns, cut unders, bus seaters, etc. There are quite a few second hand carriages on the market, and they sell, but no new ones.

W. Q. Cable, of 477 East Third street, used to be with the Williamsport Wagon Co., but that concern is not in business now. He has some orders now ready to ship.

H. J. Ring is out of business, and is working for A. Metzger.

Olmsted & Son do not make carriage or wagons any more, but sell them and do repair work.

H. K. Hollopeter has the old Williamsport Wagon Works plant at 23 West Church street.

FIRST TIME IN FOUR YEARS

For the first time in over four years the Excelsior Carriage Co., of Watertown, N. Y., has declared a dividend and the stockholders in the company are drawing five per cent. from the profits of this year's business. The decrease in the number of persons maintaining fine driving horses has seriously affected the business, and also the use of the motor truck has just as seriously made inroads on work formerly performed by the truck horses.

It was stated at the general office of the company that the carriage business this year has given indication that the industry will enjoy better business in the future than it has during the past few years. It is the opinion of those in the carriage business who are in a position to know that the increase in business the past year is due to two main reasons: first, because the supply of carriages held by the people maintaining stables at the time the automobile first came into popular use, and unloaded on the market at that time, is now seemingly becoming exhausted, and, secondly, because of the fact that the falling off in the business has caused several large firms to cease the manufacture of carriages, thus leaving the field to fewer factories.

At the present time about 75 men are employed at the Excelsior Carriage Co. and prospects are good for winter work for all hands.

RELIANCE BUGGY CO. INCORPORATES

The vehicle department of the John Deere Plow Co., of St. Louis, has been incorporated as the Reliance Buggy Co., with a capital of $200,000 fully paid.

The company will occupy the department's present quarters —the five-story factory and office building from 2200 to 2208 North Broadway. It will manufacture and sell buggies, automobiles and trucks.

A. T. Stevens, of St. Louis, is temporary president of the new company. When the organization is perfected the presidency will be assumed by J. C. Duke, general manager of the John Deere Company, of Dallas, Tex. Duke will retain his residence in Dallas. P. E. Ebrenz, of St. Louis, has been chosen vice-president and general manager of the Reliance Co., and Frank W. Edlin, secretary.

All branches of the Deere Company were divorced from the home office at Moline, Ill., and incorporated separately. In the splitting of the St. Louis corporation which resulted, the chiefs of the vehicle division will continue in their former duties by accepting the managerial duties of the Reliance Co. The implement part of the John Deere Co. of St. Louis will occupy its present five-story home at 2210 to 2218 North Broadway.

DRYING TIMBER—NEW PLAN

Commercially successful drying of wood for vehicle stock material is the latest achievement of experts in the forest products laboratory at Madison, Wis. The kiln has been perfected and is being used to dry wood to be used by vehicle manufacturers.

Manufacturers have always had trouble in curing wood by artificial heat, because of checking, warping and other losses caused by uneven drying. After drying in the new humidity regulated kiln timbers are being successfully used in vehicle construction that were not used before.

This process will aid all manufacturers using expensive timber. Although the initial cost of curing by the new method is slightly in excess of that of the old process, the saving in material will more than offset this increased expense of curing.

THE PHILADELPHIA TECH. SCHOOL

Thirty-five young men met at Central Branch Y. M. C. A. recently and formed the nucleus of a class in vocational education. The class formed is the second of its kind in the United States. Co-operating with the employers and the Y. M. C. A. in forwarding the plan are the Carriage, Wagon and Motor Vehicle Association of Phialdelphia, and the Carriage Monthly.

The course in vehicle drafting will extend over three years. The first two years deal with preliminary and advanced problems relating to carriage, automobile, wagon and motor truck building, the making and laying out of the draft of the body frame work. The last year's study depends on whether the student desires to specialize in carriage, automobile, wagon, or motor truck designing.

LUNCH OF CIDER AND DOUGHNUTS

J. M. Studebaker, one of the founders of the big vehicle manufactory in South Bend, Ind., recently observed his eightieth birthday with old-fashioned accompaniments. He shook hands with his 3,000 employes, and then gave them a lunch of cider and doughnuts. The boss was surprised with the presentation of a gold loving cup, which the men brought forward. Mr. Studebaker still reaches his office soon after 7 a. m. and remains until 6 o'clock.

VERY BUSY

The Valdosta (Ga.) Buggy Co. is running its factory night and day to meet the large demand for Valdosta buggies. For the first time in three years the factory has more work than it can do. This is attributed to the large increase in business throughout the country.

ASSOCIATION FREIGHT BUREAUS

Freight auditing bureaus are now maintained by the following implement dealers' associations. These bureaus audit freight bills for members and file claims for overcharges:

Colorado Retail Hardware and Implement Dealers' Association (the state of Colorado). Secretary, Edward Arps, Ouray, Colo.

Illinois Retail Implement and Vehicle Dealers' Association (the state of Illinois). Secretary, J. A. Montelius, Jr., Piper City, Ill.

Iowa Implement Dealers' Association (the state of Iowa). Secretary, E. P. Armknecht, Donnellson, Ia.

Mid-west Retail Implement and Vehicle Dealers' Association (Nebraska and western Iowa). Secretary, M. L. Goosman, Omaha, Neb.

Minnesota Retail Implement Dealers' Association (the state of Minnesota). Secretary, C. I. Buxton, Owatonna, Minn.

North Dakota and Northwestern Minnesota Implement Dealers' Association (the state of North Dakota and northwestern part of Minnestoa). Secretary, R. A. Lathrop, Hope, N. D.

Retail Implement Dealers' Association of South Dakota, Southwestern Minnesota and Northwestern Iowa (the territory named). Secretary, E. C. Barton, Vermilion, S. D.

Texas Hardware and Implement Association (the state of Texas). Secretary, Henry Marti, Dallas, Tex.

Tri-State Vehicle and Implement Dealers' Association (Ohio, Indiana and Kentucky). Secretary, P. T. Rathbun, Springfield, Ohio.

Western Retail Implement and Vehicle Dealers' Association (Kansas, Oklahoma and Missouri). Secretary, H. J. Hodge, Abilene, Kas.

Wisconsin Retail Implement and Vehicle Dealers' Association (the state of Wisconsin). Secretary, F. R. Sebenthall, Eau Claire, Wis.

TRUCK FREIGHT RATES TO CALIFORNIA REDUCED FIFTEEN PER CENT.

Lower freight rates on heavy commercial vehicles between eastern points and California terminals will become effective December 1, according to an adjustment secured by the General Traffic Department of the Automobile Chamber of Commerce; the reductions are 50 cents a hundred pounds in each case and amount to from 15 to 16 2/3 per cent.

On pleasure vehicles and light delivery wagons the old rates remain in effect, the new rates applying to trucks (not including delivery wagons with closed tops), chassis for such vehicles, tractors and extra parts (finished or unfinished) but not including windshields, lamps, searchlights, speedometers, cyclometers and horns. The old rates were: 36-foot car, minimum 10,000 pounds; 40-foot car, minimum 10,000 pounds; 50-foot car, minimum 12,000 pounds—Group A, $3.30; B, $3.20; C, $3.10; D, E, F, G, H and J, $3. The new rates are: 36-foot car, minimum, 12,500 pounds; 40-foot car, minimum, 12,500 pounds; 50-foot car, minimum, 15,000 pounds—Group A, $2.80; B, $2.70; C, $2.60; D, E, F, G, H and J, $2.50.

In no case shall the charges for a carload shipment of trucks handled under these rates exceed the amount charged for a carload shipment of pleasure cars of like weight. The date when the reduced rates shall become effective to Northern Pacific Coast points has not been fixed.

ANCIENT NEW ENGLAND VEHICLE SUGGESTS HOLMES'S "ONE-HORSE SHAY"

J. W. Baldwin, of Petersham, Mass., owner of what he believes to be the oldest one-horse carriage in America now in service, says:

"I believe that machinery for manufacturing wagons was unknown when this old carriage was made. Every part of it is made by hand. The crook in the shafts was cut cross-grain and then strengthened with iron. The pieces of wood that form the top are also cut across the grain to form the top round."

The carriage is supposed to be about 250 years old. It has been handed down from generation to generation in the late Angie Clark family. It stood for 60 years or more on a barn scaffold on the premises of the Clarks.

The upholstering was all made on a hand loom from wool and linen. The curtains, also, were made of linen and painted with boiled oil. The top is of very thin and tough lumber, covered with linen canvas and painted. The axles are of wood, and run in a two-horse tread. The hubs were turned by hand, and the spokes were made by hand with a drawing knife. The wheels are fastened with linchpins. The body swings upon through-braces. The body, the wheels, the axles, the bolts, even the little tacks that were used to fasten the upholstering were made by a blacksmith. The woodwork and ironwork is all in good condition.

HOW THE INGREDIENTS ARE MIXED

The new officers of The National Implement and Vehicle Association comprise some few buggy and wagon makers as noted:

The closing business was the election of officers which resulted as follows: President, J. A. Craig, Janesville Machine Co., Janesville, Wis.; chairman executive committee, S. E. Swayne, Robinson & Co., Richmond, Ind.; treasurer, H. N. Wade, U. S. Wind Engine & Pump Co., Batavia, Ill.; vice-president, W. E. Taylor, Niles & Scott Co., LaPorte, Ind.; Wm. F. Hoyt, Dowagiac Drill Co., Dowagiac, Mich.; Wm. Loudon, Loudon Machinery Co., Fairfield, Ia.; B. P. Thornhill, Thornhill Wagon Co., Lynchburg, Va.; U. H. Brown, Brown Mfg. Co., Zanesville, O.; R. F. Roberts, Randolph Wagon Works, Randolph, Wis.; F. H. Delker, Delker Bros. Buggy Co., Henderson, Ky.; A. T. Stevens, John Deere Plow Co., St. Louis, Mo.; U. S. Williams, Vermont Farm Machinery Co., Bellows Falls, Vt.; Francis Farquhar, A. B. Farquhar Co., Ltd., York, Pa.; F. Lebar, Owatonna Mfg. Co., Owatonna, Minn.

INNOVATION IN GERMAN LINSEED TRADE

An association of Berlin, for the protection of the paint and varnish industry, has recently considered the advisability of regulating the abuses in the German trade with linseed oil and turpentine. Some makers sell inferior qualities of these articles under high sounding names, such as "Prime" or "Superior," whereas the purity of the goods is more than doubtful. The association has now decided that linseed oil, linseed oil varnish and turpentine must be sold pure, and the buyer need therefore, no longer specify for pure quality. The different associations connected with the central committee in Berlin have agreed to adopt this proposal, which is welcomed by the German painters and decorators as it simplifies the purchasing of the goods, and affords protection against fraud.

PLANS ALREADY MADE

Plans and specifications have been completed for the building to be erected in East Palestine, O., for the National Tire & Rubber Co. of that place. A two-story reinforced concrete structure, 46 x 252 feet, has been planned. This building will contain the main plant and the power works. Considerable equipment will soon be ordered.

CLEARED OF ARSON CHARGE

Charles W. Stewart, vice-president and general manager of the Stewart Vehicle Co., Martinsburg, W. Va., was acquitted of the charge of setting fire to the plant of the company there. The verdict was reached after a six days' trial.

OBITUARY

Joseph Baker, of Bloomington, Ill., died at El Paso, October 31, at the age of 64. He was mayor of Bloomington several terms and also was president for a number of years of the National Implement and Vehicle Dealers' Association.

Alonzo G. House, 49, vice-president of the Dominion Carriage Co., Toronto, was found dead in the barn at his country home at Lambeth, October 27. He was stricken with heart failure. Mr. House was a widely known traveler in the province.

Charles Rauch, 68, founder of the Rauch & Lange Carriage Co., Cleveland, O., died October 22. Mr. Rauch had been a sufferer for more than a year from a complication of diseases. Eighteen months ago ill health compelled Mr. Rauch's resignation from the company he founded in 1853. Mr. Rauch was born in Stande Buehl, Germany, March 13, 1845. He came to the United States as a boy and settled in Cleveland. For many years he devoted his time to building up the carriage company that bears his name, but in later years was president of the Northern Ohio Blanket Mills, vice-president and director of the United Banking and Savings Co. and Forest City Savings and Trust Co., and was vice-president of the City Ice Delivery Co. Mr. Rauch is survived by his widow, Catherine; a son, Carl, and two daughters.

BIG SHOP BUSY

The White Hickory Wagon Co., of East Point, Ga., is very busy. A specialty is turpentine wagons.

In 1878 the business was started at Jonesboro, later moved to Atlanta, and in 1885 moved out to the present location at East Point. It has grown steadily. In 1904 and 1907 large additions were made to the plant—new concrete buildings.

B. M. Blount, president of the company, is also head of the Blount Carriage and Buggy Co., operating the companion factory across the way where there is ample evidence that the automobile has not entirely displaced the buggy.

NOW, THE LADY

Mrs. Clara Leesman, wife of the president of the Queen City Carriage Co., Cincinnati, O., filed a voluntary petition in bankruptcy in the United States court. She gives her liabilities at $42,994 and assets at $25,955. Notice of the company's bankruptcy elsewhere.

WANTS

Help and situation wanted advertisements, 1 cent a word; all other advertisements in this department, 5 cents a word; initials and figures count as words. Minimum price, 30 cents for each advertisement.

PATENTS

Patents—H. W. T. Jenner, patent attorney and mechanical expert, 606 F St., Washington, D. C. Established 1883. I make a free examination and report if a patent can be had and exactly what it will cost. Send for circular.

HELP WANTED

Wanted—Two experienced body makers for heavy work. Only first class, steady, experienced men need apply. Riddle Coach & Hearse Co., Ravenna, Ohio.

Wanted—Working foreman in wood shop, custom shop building pleasure and commercial auto bodies. Must understand blue prints. Address Body care The Hub, 24 Murray St., New York.

KENTUCKY WAGON HAS NEW HEAD

The board of directors of the Kentucky Wagon Mfg. Co. elected R. V. Board, of Boston, Mass., president, and Philip S. Tuley, of Louisville, vice-president of the company.

Mr. Board has been the general agent of the International Harvester Co. for New England, and is considered one of the best wagon men in the country.

The office of president has been vacant since the elevation of W. C. Nones to the chairmanship of the board of directors. The office of vice-president was declared vacant at the last election.

TIRE GUARANTEE

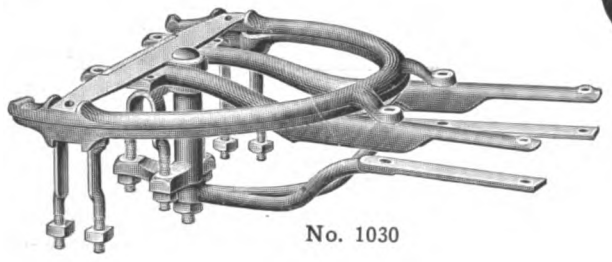
As a matter of fact, isn't the whole tire guarantee idea a fight against nature, an attempt to accomplish the manifestly impossible? From the very character of the service a tire is called upon to perform, can the duration of that service possibly be guaranteed?

FIRESTONE TO ESTABLISH BRANCH IN IOWA

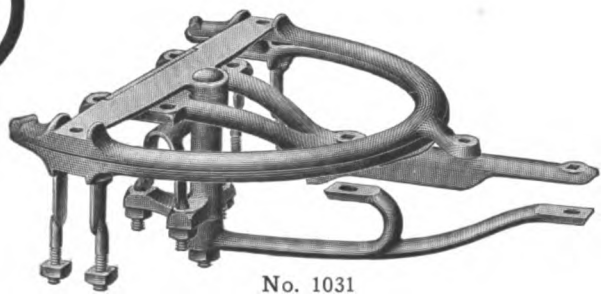
To facilitate the distribution of Firestone tires in that part of the west, the Firestone Tire & Rubber Co. is preparing to establish a branch and service station in Des Moines, Ia.

INDEX TO ADVERTISERS

BUSY BUYERS BRIEFS

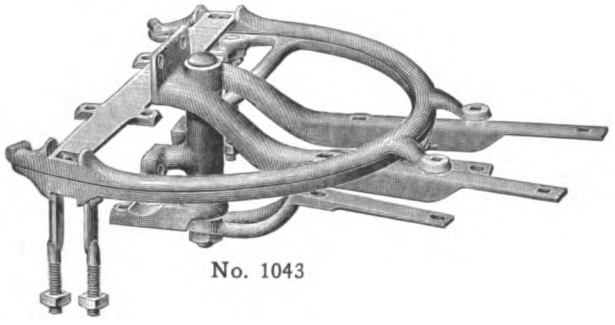


No. 1030



No. 1031

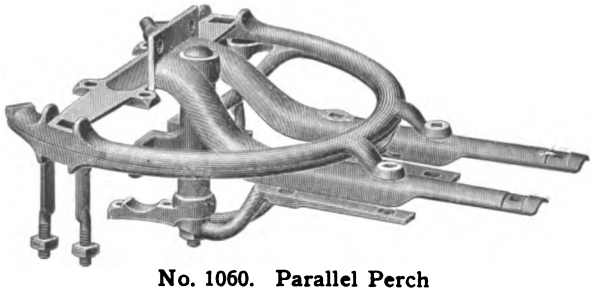
Malleable Iron Fifth Wheels



No. 1043

Made

by



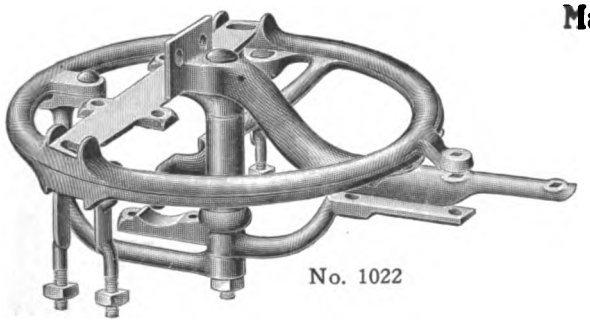
No. 1060. Parallel Perch

The Eberhard Mfg. Co.

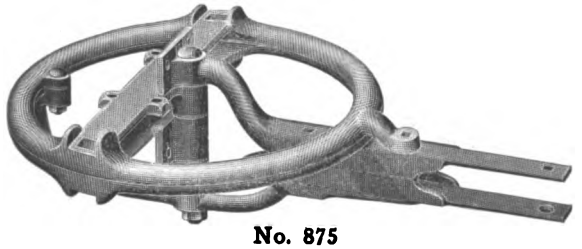
Cleveland, Ohio

Manufacturers

of

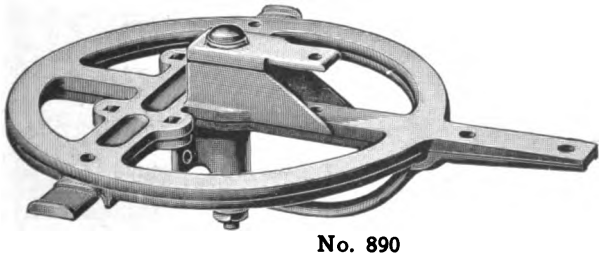


No. 1022



No. 875

Carriage and Wagon Hardware

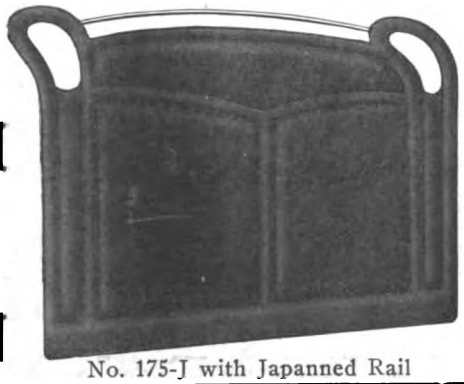


No. 890

No. 839

McKINNON DASH COMPANY

Try Our No. 175 J. DASH For Your 1914 ROAD WAGON



No. 175-J with Japanned Rail

BUFFALO, N. Y.

TROY, OHIO — ST. CATHARINES, ONTARIO
CINCINNATI, OHIO

Remember to Call for

JAPANNED RAIL PADDED DASHES

For All Vehicles

"BLACK VELVET" CUSHION SPRINGS

Manufactured Only by the

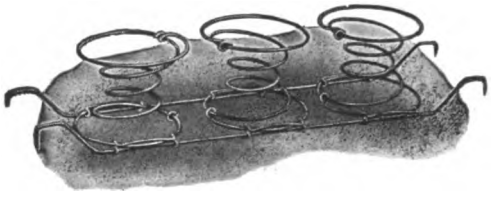
NATIONAL SPRING AND WIRE COMPANY

ALBION, MICH. WINDSOR, ONT.

THE SPRING OF QUALITY.

SPRING or SOFT EDGE CUSHION FRAME

For Buggies or Other Vehicles. Built of the Highest Grade of Steel Wire.



STRIP FOR WOOD OR BOX FRAME

WILLEY'S COLORS

The RECOGNIZED STANDARD

C. A. WILLEY CO.

COLOR GRINDERS

and Manufacturers of Specialties in

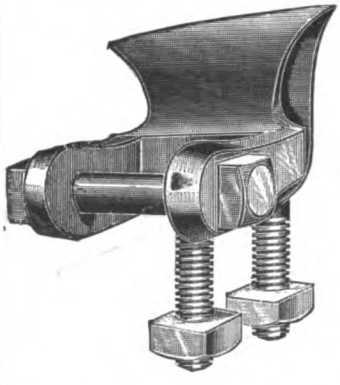
CARRIAGE, AUTOMOBILE AND CAR

PAINTS

COLORS, VARNISHES, ETC.

HUNTER'S POINT, NEW YORK CITY

Skewed Shaft Couplings



Regular or Oval Patterns For High Arched Axles

Furnished in rights and lefts for any height of arch. Oval Axle Clips 5/8 or 3/4 width to match Oval Couplings. Bolts, Clips, Couplings, Carriage Hardware and Special Forgings

Catalogue "H" and Prices on Application

COLUMBUS BOLT WORKS, Columbus, O.

The Hub

TRADE NEWS PUBLISHING COMPANY
24-26 MURRAY ST. NEW YORK

The Hub

Entered in the New York Post Office as Second-class Matter

Vol. LV DECEMBER, 1913 No. 9

THE TRADE NEWS PUBLISHING CO. OF N. Y.
Publishers of THE HUB

J. H. Wright, *President.* G. A. Tanner, *Secretary and Treasurer.*
24-26 MURRAY STREET, NEW YORK.

Other Publications of Trade News Publishing Co.:
HARNESS (monthly).....per year, $1.00
AMERICAN HARNESS AND SADDLERY DIRECTORY (annual).....per copy, $4.00

The Hub is published monthly in the interest of employers and workmen connected with the manufacture of Carriages, Wagons, Sleighs, Automobiles and the Accessory trades, and also in the interest of Dealers.

Subscription price for the United States, Mexico, Cuba, Porto Rico, Guam, the Philippines, and the Hawaiian Islands, $2.00, Canada, $2.50, *payable strictly in advance.* Single copies, 25 cents. Remittances at risk of subscriber, unless by registered letter, or by draft, check, express or post-office order, payable to the order of Trade News Publishing Co.

For advertising rates, apply to the Publishers. Advertisements must be acceptable in every respect. Copy for new advertisements must be received by the 25th of the preceding month, and requests to alter or discontinue advertisements must be received before the 12th day of the preceding month to insure attention in the following number. All communications must be accompanied by the full name and address of writer.

FOREIGN REPRESENTATIVES:

France.—L. Dupont, publisher of *Le Guide due Carrossier,* 78 Rue Boissiere, Paris. Subscription price, 15 francs, postpaid.

Germany.—Gustave Miesen, Bohn a Rh. Subscription price, 12 marks, postpaid.

England.—Thomas Mattison, "Floriana," Hillside Avenue, Bitterne Park, Southampton. Subscription price, 12 shillings, postpaid.

Entered in the New York Post Office as Second-class Matter.

Publicity Plans

We are led to believe by what we have heard that the buggy builders in the quantity class are formulating plans to advertise the merits of the American buggy, not a buggy, but just the buggy as a type.

We learn that the prevalent idea seems to be that the possible user of this splendid vehicle does not know enough about the quality and service he is buying when he buys a buggy, so this buying opinion is to be "accelerated," as the word is sometimes used, to denote the press agent is getting busy.

The splendid results achieved by the automobile maker, owing to a similar campaign of publicity, has fired the imagination and excited the emulation of the man of buggies.

Such a plan, while it will be merely vicarious in its benefits, is something that could have received attention with profit a long time ago, but so conservative has the trade always been that even in individual instances the buggy maker was very chary of using printer's ink for his own exclusive benefit. How long, and for how much he will consent to dig deep into his pocket for the general weal, it will be most interesting to note.

A very interesting "story" could be broadcasted, telling how good is that useful vehicle, the buggy. If skillfully written a lot could be told the user that he does not know, that would cause him to respect his purchase and value it more highly than he does now. Perhaps he could be taught not to consider a running stream the best and only place to wash the vehicle. Maybe he could be made to see the value of separating the dust from the cushions, as one means of making his property last longer and look better.

The technical points in the making of a buggy would excite surprise, we believe, and cause a heightened respect for the ability and skill that produced such a wonder of lightness and strength.

The campaign, however, would be such a clear instance of casting bread upon the waters, in the hope of its return after many days, that perhaps all but the very clear-sighted builders might miss the point, and become weary in well doing too soon to achieve much of a result. This remains to be found out.

Such a propaganda would naturally cost a pot of money. As the contributions to the pot would have to be in the nature of a voluntary offering, and as it is not at all likely that such a response would be very general, it might happen that the few would soon tire of such an altruistic undertaking. A fund of fifty thousand dollars would only be a good start for such an ambitious undertaking, and we don't happen to have a pair of glasses strong enough to see many buggy builders in the class of such liberal contributors for a long enough time to make an impression upon millions of people.

If the proposition were taken up in peanut fashion and snipped off in retail-size announcements in a few farm papers, we have an idea that the end and result would be a fair sum of money thrown to the birds without effect. At any rate, if the plan is put into effect, we shall see what we shall see. The idea carries the hall-mark of sterling value.

The C. H. A. T.

The Carriage, Harness and Accessory Traveling Salesmen's Association is a sterling organization of traveling men affiliated as its name indicates.

It has good features all around, because it is helpful to members and helpful to manufacturers who need the

services of men who ought to be the flower of the trade. This means service of the highest order.

We are surprised the membership is not larger, and can only account for it by supposing it is only the thinking, earnest traveling men who are attracted.

What is offered by the association is worth while. We hope what is here written will be read by some unattached traveling men who will be made curious to know more. If this should be happily true, read the report of the annual meeting in this number, and note particularly for future reference the name and address of the secretary, J. L. Nelson.

Be a Booster!

The buggy fraternity—they are all brothers in good buggy times—have finally, through the action of the executive committee of the C. B. N. A. decided to abstract a leaf from the book of methods of the flippant automobile builder, and become Buggy Boosters.

A better time for such boosting could not be selected, because the builders are full of the enthusiasm of a good past season, and bursting with appetite for the good things that 1914 has in prospect.

It is a fine spirit. It will produce results, we believe.

There Is Too Much "Play"

Quoting an automobile journal of much pretense we read, "it would be much easier for us to 'play' for a share of the cyclecar money by lending our pages to the painting of glowing pictures—" etc.

Despite all the high-brow talk about the dignity, mission, influence and true hewing to the line of the trade press that so charms the listener at conventions and symposiums, the fact remains that the best of them go to school for their trade ethics at the cashier's desk in the business office.

No criticism should be expressed at this method of conducting the journals, if that is the maturely considered policy of the management, but the hypocrisy of pretending to high ideals that look way over and above the counting room end of their "game"—a game in which all the moves of the play are for the purpose of rapidly achieving the king row—leaves a dark brown taste with those who hate cant.

Perhaps New Road Regulations

There has been a meeting of officials that shape up as a commission, and representing quite a number of states, over in New Jersey, and the object is to try and have done away with the conflicting laws and ordinances, mainly affecting motor cars, and a brand new deal shuffled up for the purpose of securing one uniform law, a sort of interstate regulation, that shall fall on the just and unjust alike.

The basis of the law, which is being drafted, is to get as close to the common law of the road as possible, also to eliminate speed limit regulations, and it is to have something to say on the matter of taxation.

While these lawmakers mostly were representative of motor car interests, the chairman was the editor of Rider and Driver, a journal in the interests of horse owners, that devotes its attention to riding and driving, and incidentally the very swagger people who affect those delightful pastimes. Rather an interesting mix-up!

On the Bargain Counter

The shrinkage in values of the automobile and other plants related to the industry, as judged by the offers made for the property and in many instances accepted, would indicate that there must have been as much air in the concerns as an over-inflated tire.

When the liquidation is completed we will have come to the end of the "automobile game" or gamble, which is a true statement of what it was, and the business will find its sober, the-morning-after, business-like level.

From now on motor cars will be sold like vehicles. It will change the methods of the business greatly.

And what a stupendous lot of junk will be scrapped that was once high-cost machinery and tools!

We believe the industry as a legitimate manufacturing proposition will be the gainer.

Timber to Burn

The forest officers of the government state there are 200 billion feet of merchantable timber in the Philippines, practically all of it owned by the government, and available under very favorable terms. In almost all cases the forests can be easily logged by the most improved machinery and methods. A complete report on this body of timber may be had by writing the director of forests in Manila, or the bureau of insular affairs of the War Department will also answer the purpose.

Going to Extremes

The silly luxury of interior fittings and furnishings of passenger automobiles as displayed at European shows, takes the work out of the vehicle class and makes of it parlor or saloon house decorations. Seats are spindled-leg sofas, roofs are frescoed in rich stuffs, and in short the luxury of it all has gone to such extremes that it has become a reduction to absurdity to consider such a mass of upholstery, interior decoration and luxury ornament a vehicle. It is a parlor on wheels, and the parlor of a prince at that.

Lower Priced Tires

Quite a year ago this journal thought it saw conditions in the crude rubber trade that would work out in cheaper tires for vehicles. The conditions as we saw them were stated. Probably they were seen by others, but they were not stated. The trade journal writer copies the habits of the ostrich when he sees things he does not

want to see. Perhaps it's a good practice when the readers of the journal are not much considered.

There is now a sensible reduction from former prices of rubber tires.

As rubber has come down the scale of price from $3 to 75 cents for Para, we do not believe that the maker of tires is suffering any in the net profits; there is no good reason why he should, but there is a very good reason why he should pass along to his customer as much as he can of the gilt on the ginger bread.

Some Vehicles for One Man

The Amir of Afghanistan, whose complete title is Amir of Afghanistan and its Dependencies, and Light of the Nation and of the Faith, has a stable of 58 motor cars to carry around all these dignities. None of them as yet are American. He is now dabbling in motor trucks and has made a start with fifteen.

No American buggies are used, but as the Amir has a passion for catalogues, especially those full of pictures, anyone with a spark of enterprise might send his catalogue to R. A. Dubash, care Clubwalla & Co., 17 Church Gate street, Fort Bombay, India. This man is the Amir's special Handy Andy. His Majesty has the nice habit of paying cash in advance.

The agent is quoted as saying he would specially like to receive American catalogues.

SOUTHERN BUILDERS MEET

The third meeting of the Vehicle League was held in Greensboro, N. C., at the Guilford Hotel, November 18.

Out of a total membership of 29 there were 20 members represented.

A review of the work already accomplished and the splendid benefits received from the association was a source of gratification to all.

The treasurer reported finances in good shape; that all accounts and expenses were paid to date, and a cash balance in the treasury. Commissioner's office has been fully equipped and the results of the credit bureau so far accomplished, have been very satisfactory.

Three additional manufacturers were received into membership, making a total of 29.

Among the several items of business taken up were the following:

First—A constitution and by-laws were adopted, it being evident that the league promises a long life of usefulness.

Second—The authorization for a department for co-operative collections.

Third—An investigation into the matter of freight rates now pending before the Interstate Commerce Commission, and, if possible, to get a reduction in car load freight rates in southeastern territory.

Fourth—The creation of an employment bureau.

Fifth—Publication of a "dead stock" list of vehicle materials.

Sixth—Guarantee abolished.

It will be gratifying to most of the carriage trade to know that the Vehicle League at this meeting passed a resolution to join the C. B. N. A. in recommending the elimination of the guarantee on vehicles, to go into effect January 1, 1914. There is no doubt but that the trade generally, both dealers and manufacturers, are ready to take this stand.

The general tone of the meeting was most encouraging and the members are more enthusiastic than ever over the success of the movement.

Mr. Champney, of the Eberhard Mfg. Co., and Mr. Adams, of the Cleveland Hardware Co., representing the accessory trades, were present by invitation, and their suggestions were most helpful and encouraging.

TRADE ASSOCIATIONS, MANUFACTURERS, ETC., DEMAND DESIGN PROTECTION AND AMENDMENT TO KAHN LAW

Over 300 manufacturers, importers, merchants and trade press editors, representing many industries of the United States, met in convention at the Hotel Astor, New York, November 21. It was called by the National Registration League and a committee of the Federation of Trade Press Associations.

Robert W. Nelson, president of the American Type Founders Co., was elected chairman, and J. Clyde Oswald, of the American Printer, vice-chairman of the National Registration League. S. M. Weatherby was elected secretary of the league, with headquarters at 1309 Race street, Philadelphia, Pa. E. W. Bradford, of Washington, D. C., was elected general counsel.

The entire proceedings of the convention comprised vigorous protests by the delegates against the piracy of valuable commercial designs and urged the enactment of a Federal law for the registration of designs for manufactured products.

GREAT PROGRESS IN ROAD BUILDING

An interesting comparison between the expenditure on public roads in the United States in 1904 and in 1912 has just been compiled by the Department of Agriculture through its Office of Public Roads, showing the tremendous growth that has taken place in the movement for better highways within the last eight years.

In 1904 the total expenditure on all public roads in the United States was $79,771,417, but in 1912 the expenditures for this purpose amounted to $164,232,265. The expenditure per mile of public roads in the United States for 1904 was $37.07, but the expenditure per mile for the year 1912 had doubled, amounting to $74.65. The expenditure per inhabitant in 1904 was $1.05, bu tin 1912 it amounted to $1.78.

The greatest progress in road building has been made in the states which contribute from the state treasuries toward the construction of state-aid or trunk-line roads. In 1904 there were 13 states that contributed out of the general fund $2,607,000, but in 1912 there were 35 states which contributed $43,757,438. The states having the largest expenditures for state-aid and trunk-line roads in 1912 were as follows: New York, $23,000,000; Pennsylvania, $4,000,000; Maryland, $3,370,000; Connecticut, $3,000,000.

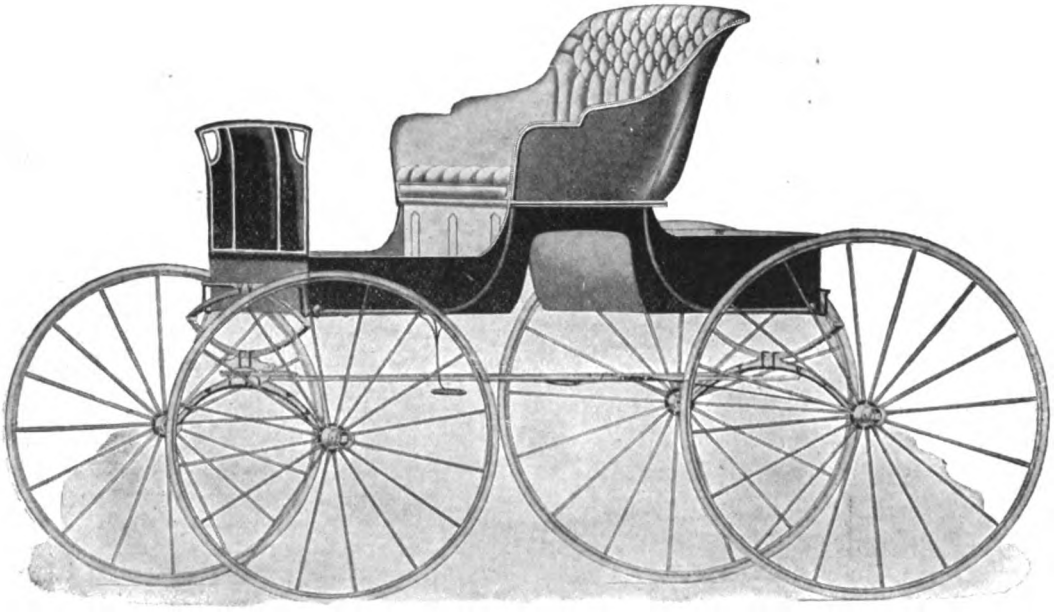
BUSINESS GOOD—MEN WANTED

The York Carriage Co., manufacturer of wagons and carriages, York, Pa., are advertising for 100 mechanics, body makers, blacksmiths, trimmers and painters. It is their intention to put on all mechanics they can make room for and push the carriage and wagon business to the limit. They have made arrangements to eliminate all outside interests as soon as it can be accomplished, and devote their entire time and attention to the carriage and wagon business, which they have conducted so successfully for the past 30 years.

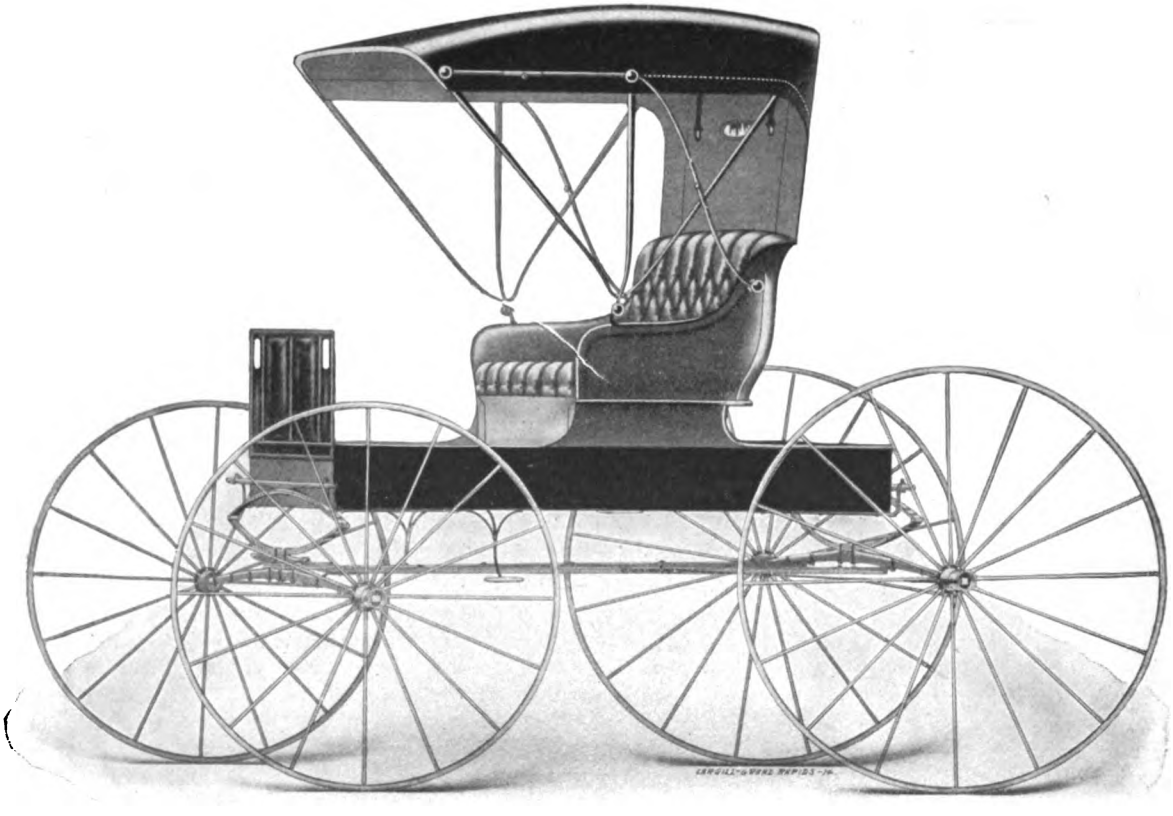
NEW TURPENTINE SOURCE

It is said that western yellow pine is attracting attention as a new source of turpentine as the southern supply becomes exhausted.

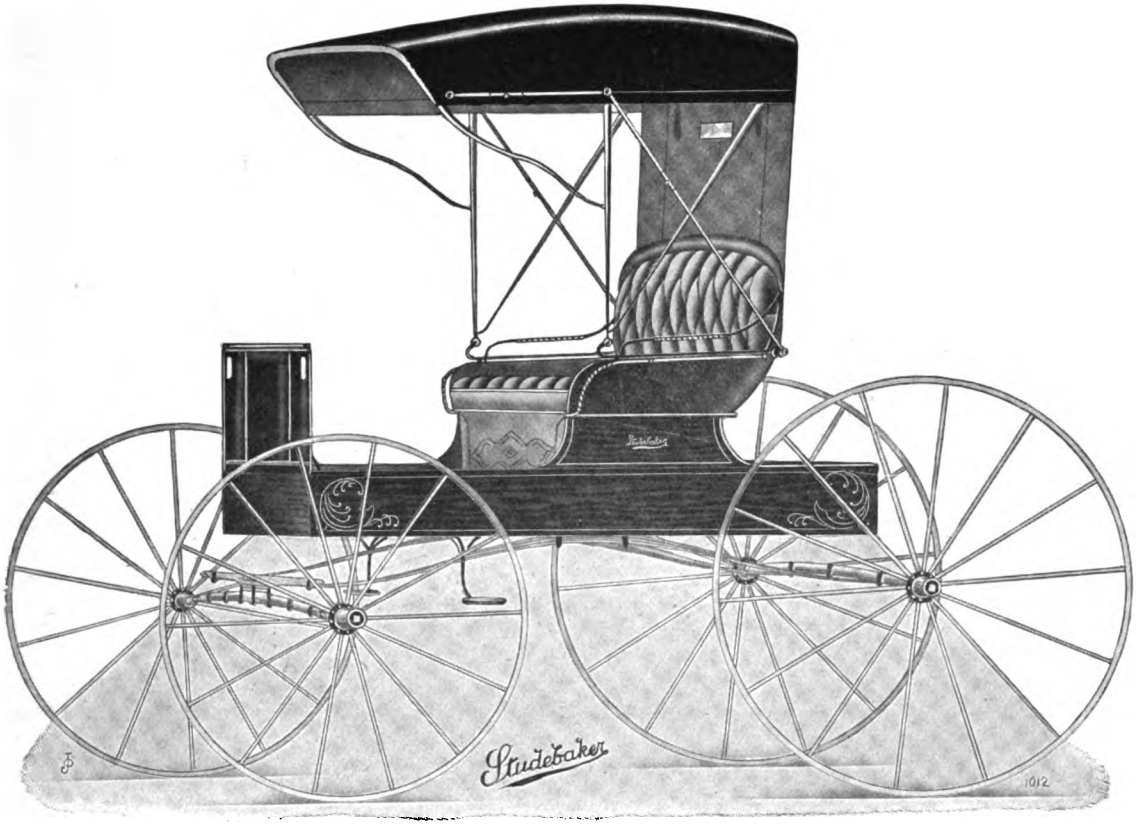
The Season's Fashions in Vehicles



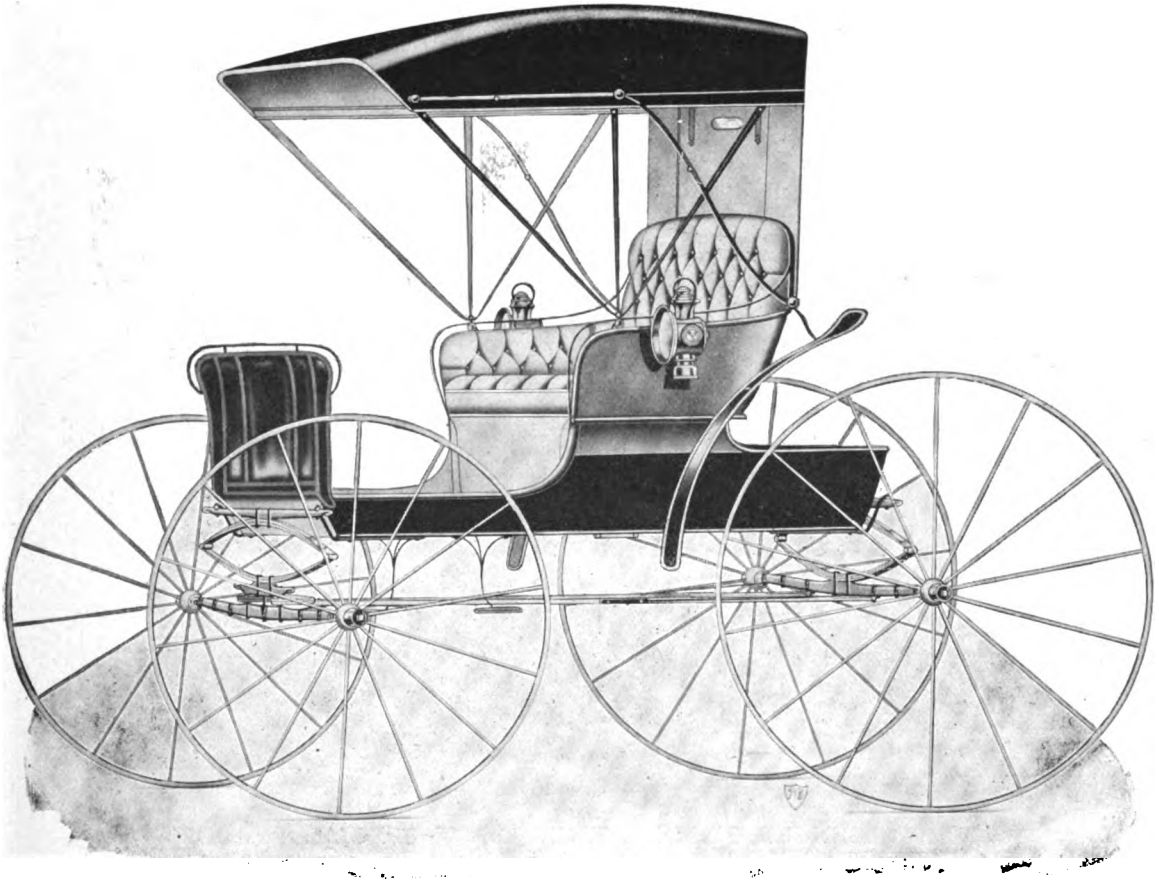
CUT UNDER BODY, AUTO-STYLE SEAT



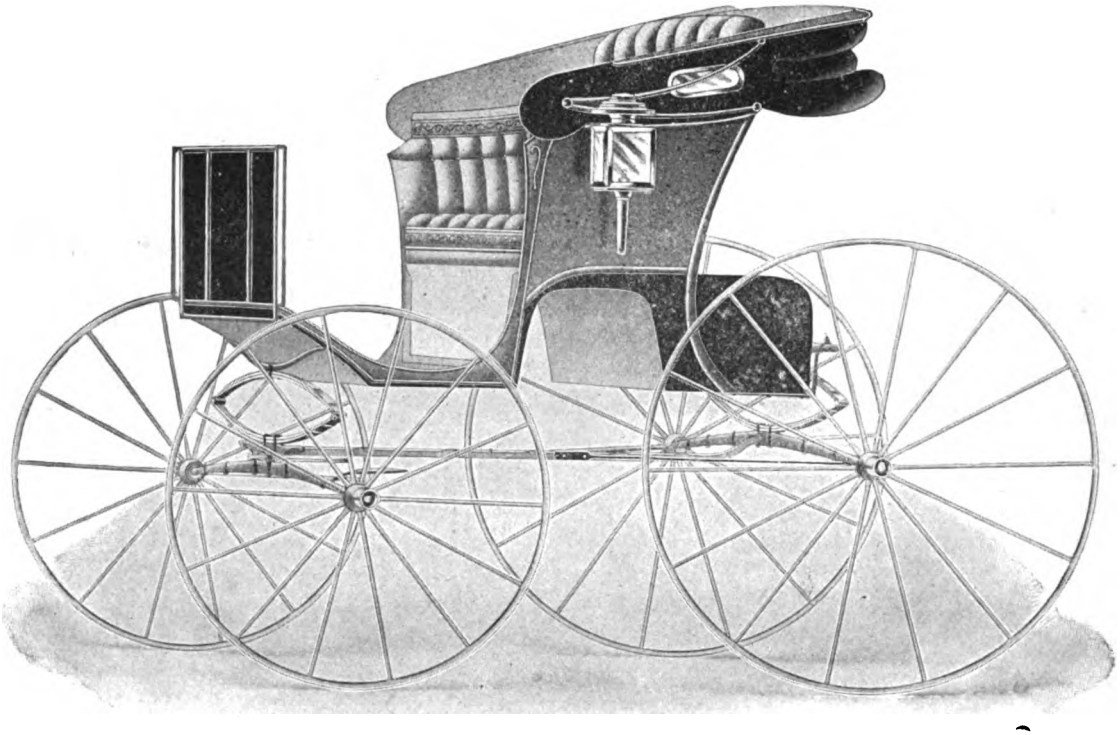
BUGGY WITH VERY LIGHT AUTO SEAT ON LIGHT PIANO BODY



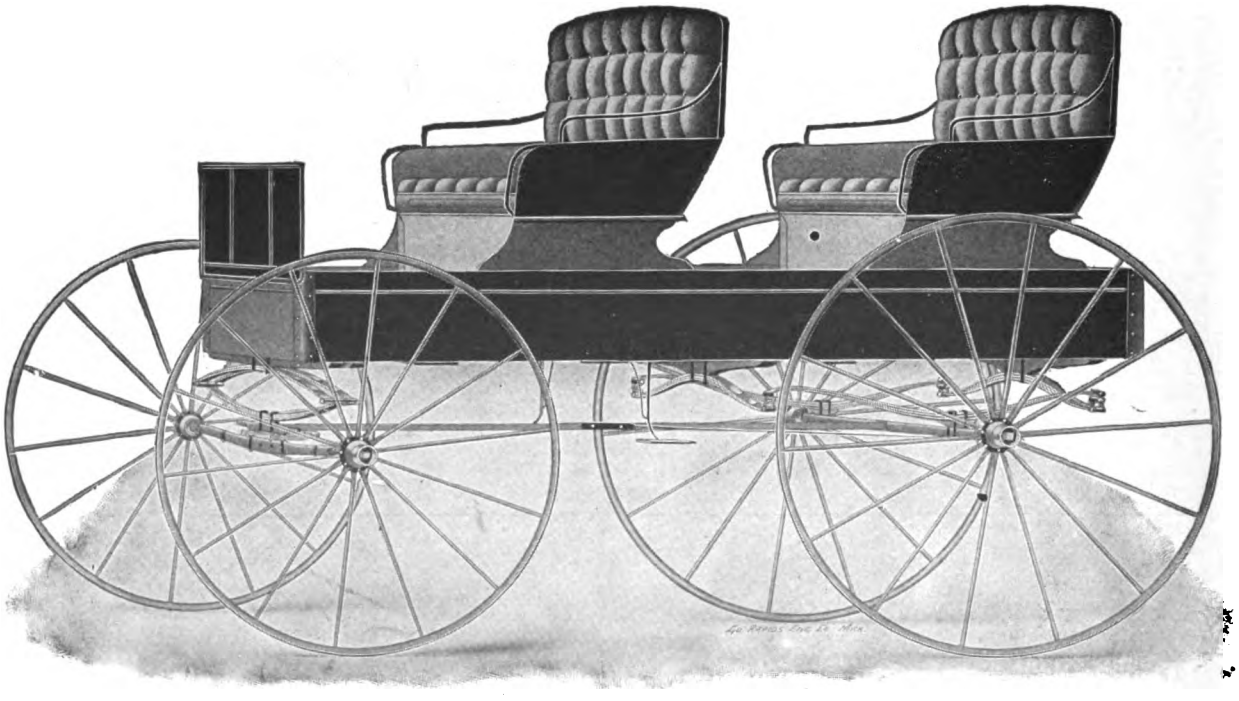
PIANO BODY, TOP WAGON, SIDE SPRINGS



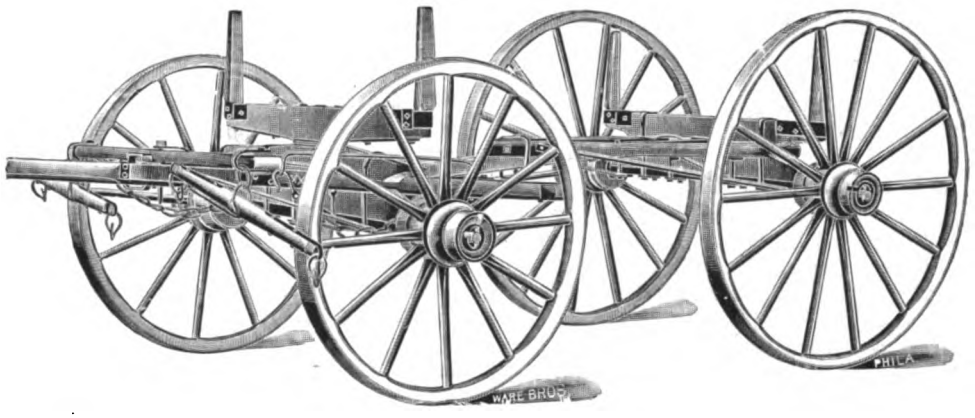
CORNING BODY, TOP WAGON, FOR SOUTHERN TRADE



CUT UNDER BODY, STANHOPE-STYLE SEAT



FOUR PASSENGER, PLAIN PANEL WAGON, SPECIAL SPRINGS



TURPENTINE WAGON GEAR
Specialty of White Hickory Wagon Co.

BROCKWAY MOTOR TRUCK CO. LIGHT DELIVERY WAGON

SEASONABLE STYLES

The style offerings in light work by the wholesale builders proceeds in the line of refinement of details rather than in change of form. The high-backed auto style seat seems to find appreciative buyers. This gives a chance for trimming stunts that yield selling points for the dealer.

We call attention to the job shown from the Eckhart Carriage Co., of Auburn, Ind., because in its construction, and the general air of neatness and finish it conveys. The finish is good, as well as wear-resisting, and we have no doubt it is popular.

We show a wagon gear from the White Hickory Wagon Works, of Atlanta, Ga., that has a great sale as a turpentine gear.

These gears are made especially for turpentine hauling, having, in addition to 48 inches width between standards and high wheels, the linchpin axles and linchpin steel skeins, which admit of greater strain in the side motion of the wagon. They are also especially ironed, adding to the strength, and have heavy bolsters, hounds and tongue. They are not simply farm wagons with wide bolsters and high wheels, but made especially for the purpose, from a careful study of the wants of the trade. Specifications complete include whiffletrees, stay chains and tongue chains, but no seat or brake.

The auto truck is from the Brockway Motor Truck Co., of Cortland, N. Y., and shows what an ex-carriage builder can do when he gets into the business. The 36-38 inch wheels, the springing, the air-cooled three-cylinder engine of 20 horsepower, and the panel body, built as it should be, are all specifications for a job that will wear and deliver the goods.

HOW BRITISH CYCLECAR VARIES

Bearing in mind that the true cyclecar is limited by definition, a review of the present British light automobile field reveals out of approximately 50 different makes, 27, or roughly 60 per cent., that are really cyclecars. Of the remainder, 33 per cent. are miniature cars embodying the familiar forms of automobile mechanism in practically every respect, mounting well designed if somewhat top-heavy bodies, and selling at prices that frequently are close to $1,000. The balance are nondescript, but have the common characteristic of carrying but a single passenger, and hence are loosely termed monocars.

Referring to the true cyclecar, according to the definition established by the Federation International des Clubs Motor Cycliste last December, two classes are recognized, large and small. The large cyclecar is defined as having a maximum weight of 784 pounds, an engine having a piston displacement of not more than 1,100 cubic centimeters, or 67.2 cubic inches, and tires of not less than 60 millimeter section, or 2⅜ inches. The small cyclecar, on the other hand, must have a chassis of not less than 330 pounds, nor more than 660 pounds weight, with an engine of not more than 750 cubic centimeters displacement, or 45.7 cubic inches, and tires of a minimum section of 55 millimeters, or 2 3/16 inches. All cyclcars must have a clutch and change-speed gear.

The British products answering to this general description, as already indicated, form a small majority of what is commonly referred to as cyclecar practice. Practically without exception, they are sold with equipment consisting of three lamps, a horn, a top and windshield. The average price, taking cars that are now on the market, is £114, or approximately $570; the maximum for the class being £185 and the minimum £95. The average weight is 576 pounds, the maximum being 784, and the minimum 280. This latter, however, is an exception, the next lightest machine, of which there are several, weigh in the neighborhood of 500 pounds.

With regard to the more general specifications, a remarkable unanimity in the selection of engine sizes, clearly reflects the closeness of the average British cyclecar maker to the parts producer; thus far the British cyclecar is very largely an assembled product. Out of the 23 machines, of which particulars are obtainable at the moment, no less than 16 have two-cylinder motors rated at 8 h.p., and 11 have twin motors of 85 x 85 millimeter dimensions, or roughly 3 11/32 inches bore and stroke. Two four-cylinder motors are used, and but one, in the true cyclecar classification, having a single-cylinder motor. Practically 90 per cent. are air cooled, and magneto ignition is employed almost without exception.

More than one-half of these little cars are driven by some form of friction change gear, the double-disc type, as being the simplest, naturally predominating. About one-fourth of the remainder are built with selective gear. Including one or two cars with friction drive in which the control is arranged to give definite speeds, instead of being infinitely variable, 52 per cent. have three speeds, and 35 per cent. two speeds. One machine has four speeds obtained by the novel expedient of employing a two-speed sliding gearset in conjunction with a pair of variable pulleys on the countershaft. Ten machines have master clutches in conformity with automobile practice, and of these eight are of the simple cone variety, the other two being disc patterns.

Double belt drive to the rear wheels is employed on 37 per cent. of the models under discussion, while an equal number have shaft drive with bevel gears. Four of the true cyclecars have worm-driven axles, three have single-chain drive to a live axle, two have double-chain drive and one is driven by a single belt.

Great variety is indicated in frames, one reason being that in the present state of the industry the frame is one of the few elements of the machine in which the builder is left entirely to his own discretion, with few dimensional limitations imposed by the manufacturer of his motor and other parts. Apparently the tubular frame is slightly in the lead at present, with wood and channel iron or steel about evenly divided for second honors.

Similarly there is a division of the makers with respect to methods of suspension, and several distinctly novel types have been introduced. Notwithstanding this fact, however, some 54 per cent. of the makers at present building cyclecars have retained the well-tried automobile suspension of semi-elliptic form. Brake construction is indefinite and difficult to classify, but owing, perhaps, to the fairly large number of cars that, while cyclecars in size, are practically small automobiles in every other respect, it is made to appear that the double external-internal form of brakes on the rear wheels is the favorite. For steering, the simple rack is generally preferred.

Essentially—in theory at least—a narrow tread vehicle, it would seem that no sort of standard has yet been set for the cyclecar. British practice shows the 42-inch tread to be used on a little over one-third of the cars whose specifications have been considered herein. The remainder of the cars now under review have treads ranging in width from 40 to 48 inches. Only one of the machines in question has a wheelbase of more than 90 inches, the remainder scattering down to a minimum of 72 inches. Tire sizes also are not fixed, but vary considerably more than do the weights. The most popular size, however, is 650 x 65 millimeters, or roughly 23⅜ x 2¾ inches.

L. P. C. CO. HAS $250,000

The L. P. C. Motor Co., of Racine, Wis., recently was incorporated with $250,000 capital. The company's factory and general offices are located at Racine Junction. The corporation will manufacture the "Lewis Six." Capt. William Mitchell Lewis, president, has long been identified with the automobile industry, having been president and general manager of the Mitchell-Lewis Motor Co. from its inception. The new "Lewis Six" is a six-cylinder, six-passenger car.

EXECUTIVE COMMITTEE MEETING IN NEW YORK

The executive committee of the Carriage Builders' National Association held its annual meeting at the Hotel Astor, New York City, November 21.

William H. Roninger, the newly elected president of the association; C. A. Lancaster, chairman of the executive committee, and Messrs. Staver, Dort, Sayers, Sechler, Luth, Ebrenz, Fulreader, Straus, Bannister, Wrenn and McLear, were the gentlemen present.

C. A. Lancaster was selected as chairman for the ensuing year and a committee consisting of Messrs. Sayers, Fulreader, Ebrenz and Dort, was appointed to compile and arrange a general cost system for the carriage manufacturers that could be used as guide to the average cost of the different styles of horse-drawn pleasure vehicles, and which could also be changed to suit the requirements of each particular manufacturer.

The executive committee also, at this meeting, set the dates for the 1914 convention, making them a little earlier than those of the last convention. September 28 to October 2, when the weather conditions at Atlantic City are most favorable, and low excursion rates in force, were the dates named. The convention sessions and exhibition will be held on Young's Million Dollar Pier, where two very successful gatherings have been held within the last few years. It was again agreed to close the exhibit hall from 10:30 a. m. to 12 noon on Tuesday and Wednesday, but there will be no closing on Thursday.

Provision was made for a vigorous campaign of publicity during the coming year, so that the country at large might be made aware of the extent of the horse vehicle industry, and especially of the advances made in the trade during the year of 1913, which was in many respects one of the best in our history.

Other matters of vital importance to the trade were considered and placed in the hands of committees to be worked out in proper form. These matters will be made public later on, when the plans are complete.

Business in the carriage trade has been excellent this year, and the prospects for 1914 are as good as we could desire. All those present at the meeting expressed themselves as well satisfied with this year's volume of business, and were of the opinion that 1914 is going to be an even better year for the vehicle trade.

MR. W. H. RONINGER'S DINNER

According to custom the new president of the C. B. N. A. gave an inaugural dinner to the members of the C. B. N. A. executive committee, and his personal guests.

This dinner was given on the enclosed roof garden of the Hotel Astor in New York City on November 21, after the adjournment of the annual committee meeting.

The following gentlemen were present: Ex-president C. C. Hull, Secretary Henry C. McLear, Theodore Luth, Chas. A. Lancaster, chairman of the committee; Chas. E. Adams, C. H. Albrecht, W. A. Sayres, T. M. Sechler, Lewis Straus, R. S. Ward, J. W. Fulreader, O. B. Bannister, E. J. Hess, H. B. Staver, P. E. Ebrentz, J. D. Dort, C. O. Wrenn, G. H. Huston, of The Spokesman, C. H. E. Redding, and W. H. Hatton.

Those absent were W. H. McCurdy, Carl P. Schlamp and R. C. Ware. The absences were unavoidable in each instance.

The Astor roof garden was beautifully set with a generous round table, beautifully flower-decorated, and with music, singing, and all that made for enjoyment, the guests were in a happy frame of mind, and ready to appreciate the following menu, which was as inticing to the palate as it was good to the eye.

A small, but well advised innovation made at the instance of the host of the evneing, was putting the menu in good English in place of mongrel hotel French.

The Menu

Beluga Caviar
Clear Green Turtle Fine Champagne
Relishes
Terrapin, Astor style
Breasts of Spring Chicken, with fresh mushrooms
Chateau Potatoes Green Peas
Fresh Artichokes, Holland style
Prunell Sherbert
Roast Mallard Duck (Private Preserve) Currant Jelly
Fruit Salad, Tropical style
Dutchess Ice Cream
Cakes Coffee

The wines included Chateau Rieusser 1901 Sauterne and Pommery green seal.

Those who like good things can see at a glance that this was some dinner!

Following the custom, each guest was called upon for a "few remarks" after a very warm welcome by the host, who said he was sensible to the compliment of the large gathering, especially as many had come from long distances to be with the company. He had a few kind words for Missouri also, which it was learned, was the greatest egg state on the map, producing enough in one year to encircle the globe four times.

After a few pleasantries he earnestly besought all, particularly accessory members, to impress it on their traveling men to boost the association membership to the very limit. He also touched on the subject of more and better publicity for the carriage trade, and referred to the movement now forming to bring it about.

Mr. Hull followed with an address that held the serious thought of the good the association had accomplished in cementing the bonds of friendship. Then he passed to the trade of the year just closing, speaking of its fine fruits and the excellent prospect 1914 held for the buggy builder.

Mr. Bannister was full of the glory of the prospects in the south, and he gave many interesting examples, then shunted off into a lighter vein by telling about his early experiences of the host.

Secretary McLear spoke in a serious and reminescent vein, telling of the early life of the association, its steady grasp on the ideals that have stood for its success and been responsible for its long life, and urged that they be maintained in the future as they have been upheld in the past, that the 42 years of the association's life might be made 84! He emphasized the fact that there had never been strife, dissension, or anything but harmony in the councils, and that the power for good exerted by the association could not be measured in mere money.

Mr. J. D. Dort was expected to poetize a bit, but he was not in that vein this time. He was no repeater, like the man in the story he related, who was a German in a German ward, a clerk of the poll in a "dry or wet" election. As they tallied, he called out vet, vet, vet, then he found a dry, after another string of "vets" he found another "dry," when he exclaimed: "Got in Himmel! der son of a gun is a repeater!"

He opened up the subject of the world's market for vehicles, and its allurement of opportunity to the buggy builder, and thought it ought to be cultivated. To this Mr. Ebrenz demurred on the ground that we were not cultivating our own country to an extent that represented more than ten per cent. of the possible field.

Mr. Ebrenz continued with some very informing talk on costs, system, and efficiency, drawing the data from personal experience in the factory he managed, and made some statements that were very surprising and cheering to his listeners.

Mr. Ward was supposed to say something about his experiences as a tanner among and for the automobile and buggy trade, but he made his point with a story, then stopped right there. Here is the story. A group of men ascended the elevator to the realms above, and after "registering" and put-

ting down where they were from, stood about waiting to be "assigned." One noticed a group standing at one end of the counter and he asked host Peter who they were. "Oh!" said Peter, "they are auto dealers." He asked about another group he saw at the opposite end of the counter. "Those? They are auto builders." Then, he asked, who are in that group away off there under the trees. "Those," answered Peter, "are buggy builders." And why are they away off there nearly out of sight? "Oh," promptly said Peter, "I put them there because they are the only ones I can trust out of my sight!" The point of the story was highly appreciated.

Mr. Wrenn spoke about the southern builders, and wanted it understood there is no south in the trade, it is just east and west, and all builders should be so classified. He said 90 per cent. of the builders in "the east" (south) would be in the association soon, and he was going to see to it that his prophesy was fulfilled.

Mr. Adams told a story that he said illustrated his idea of the hospitality. The point was appreciated.

Mr. Luth told about what the Freight Classification committee had done for the association, the thousands it had saved in freights to buggy builders of the entire trade, and the favorable influence it exerted among railroad men, etc.

The other speakers all had something interesting to say that was received with attention and acclaim, and the dinner closed with the expressed opinion that it was one of the very best in recent years in all respects, but especially for what had been said, and what thought could be taken away that would bear fruit on personal application.

COMMERCIAL BODY WORK ABROAD

There is little doubt but that the finish and design of bodies mark a distinct advance in the work of the coach builder as applied to commercial motors.

On the whole, box-van bodies are of more sturdy construction than has been usual until quite recently, and this without any sacrific of outward appearance. Waterproof sides, either of prepared wood or of some special preparation, are very general. High side doors, with an extension for the comfort of the driver, mark an advance in construction of all-round advantage. Greater attention has been paid also to the design of the entrances to van bodies. Doors are larger, in some cases tail boards are fitted, and on many machines the driver can enter the body from his seat, in order to hand out parcels without the necessity of stepping on to the road. The tendency seems to be to obtain a flush-sided body, from which all outside fittings have been removed. Hinges are of the type which sink into the sides as the door is closed. Handles in several cases have given place to the lever-controlled catch, placed either on the upper edge or in the frame of the door. Several torpedo char-a-bancs bodies have fitted doors on one side only. By this arrangement the driver can assure himself before starting that his passengers are safely seated and the doors closed. Doors to the last row of seats have been abolished in several cases on the grounds of weakening the rear part of the body. Passengers can enter, in most such cases, by means of a swivelling seat on the second row. The bodies are higher as a general rule than has been the practice for some time. Sun blinds are fitted in some cases, while the steps are lower and broader.

For trade vehicles brass is in almost universal use. Much attention has been paid to the provision of sliding shelves in van bodies. Previously unoccupied space underneath the body has, in many cases, been utilized for the fitting of ample sized lockers, in which all spares, including a supply of gasoline tins and lubricating oil, can be carried.

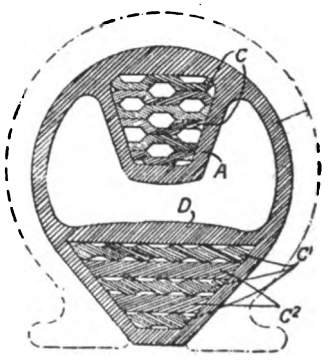
Much valuable material, alike in wood, metal and upholstery, is now used in the construction of bodies. With the advent of the reliable chassis, and improved springing, together with better protection from climatic conditions, it has become possible to employ high class, and even delicate fittings and materials, on goods vehicles.

Domed mudguards do much to give an attractive and substantial appearance on many machines. The day of the shaky oil lamp is now over, and commercial motors are now fitted with lamps which often form an integral part of the body as attractive and reliable, although of sturdier construction, as those generally used on pleasure cars.

Body makers generally have grasped the fine opportunity offered by the ordinary type of box van. The beading, paneling and lining are all used in the most artistic manner, and the upholstering and other fittings in keeping.—Commercial Motor.

PNEUMATIC THAT WORKS WHEN DEFLATED

A Frenchman has invented a pneumatic tire—cut of which is here shown—which is designed to work, at least comfortably well, even when it is entirely deflated. In addition to the



air chamber, which is of peculiar shape—shown by the white space in the center of the cut—there is an upper chamber (A) and a lower chamber (D) which are packed with elastic strips (C). While, of course, tire is intended to be inflated, if a puncture should occur it would be possible, according to the inventor's idea, to get along without discomfort on the resiliency imparted to the tire by these two bodies of elastic strips.

THE FUTURE OF THE RUBBER INDUSTRY

Much interest has been shown in London in the recent lecture of Dr. Philip Schidrowitz at the Chemical Engineering Exhibition on the "Future of the Rubber Industry." The lecturer recalled the fact that the increased supplies attracted by the "boom" of three years ago again brought prices to a reasonable level. He considered, however, that some critical years were at hand, involving for manufacturers a period of interest and difficulty.

The problems of the future he briefly summarized as follows: "How much rubber may we expect on the market, and how will price be affected thereby? What are we going to do with all this rubber that is coming? Will it be for the benefit or to the detriment of the industry?"

Apart from the question as to whether the new Brazilian "Defence Law" would produce the anticipated results of increased yield and reduced cost, Dr. Schidrowitz expressed the opinion that the production of plantation rubber is sufficiently large to make it the dominant factor in the world's rubber markets. The future increase in that production might effect a radical change in the various branches of the industry. Assuming this year's plantation output as 50,000 tons, he estimated the quantity for 1915-16 as possibly 100,000 to 150,000 tons, and for 1920 as 200,000 to 300,000 tons. Even without any material increase from Brazil, the world's production in two or three years' time might be quite double that of the present day, while in six to seven years the supplies might have trebled or quadrupled.

FIFTEENTH ANNUAL MEETING TRI-STATE V. AND I. D. ASSOCIATION

The fifteenth annual convention was in many respects the very best held. In matter of attendance it was perhaps not so large as some previous conventions. There were approximately 600 dealers in attendance, together with more than 300 members of the Carriage, Harness and Accessory Traveling Salesmen's Association. Travelers, factory representatives, etc., swelled the attendance to a number in excess of 1,000.

The sessions, and attendant features, were educational. This was brought about by the introduction of novel methods, inaugurated by the Tri-State association. There was a desk presided over by Ed. S. Ralph, who has charge of the publicity of the American Seeding Machine Co. He advised members as to the best methods of advertising, how to prepare the publicity, get the best results, without a loss of money.

Another desk was in charge of E. P. Armstrong, of Donnellson, Ia. He gave advice on the organization and maintenance of local clubs. His desk was not as well patronized as the others until the third day—after the dealers had heard the arguments favoring the formation of local clubs. More than twenty local clubs were given a start which will bring about organization in the future.

Curtis M. Johnson, Rush City, Minn., had charge of the desk where dealers might study their cost of doing business under the teaching of expert cost keepers. He assisted a number of dealers to get cost of doing business and a profit.

Office records were explained at the desk in charge of W. L. Derry, Vermont, Ill., who gave expert advice, and as a result there will be many retailers keeping books by simplified methods as a result of his talks.

John C. Schultz, of the Wooster Hardware Co., Wooster, O., presided over the desk of salesmanship and special sales plans. He had occasion to explain how they could best advance their sales through plans of this nature.

The membership desk was in charge of H. C. Otterbach, Wellington, O. A number of new members were added to the rolls.

Everyone seemed to try his very best to spread the gospel of education to those who needed it, and as a result a number of dealers confessed that they had received much good through the private and public talks.

President Neutzel delivered his annual address, saying: The past year has been one of general prosperity. Even the bumper crops of one year ago are exceeded by those of 1913 in money value.

"It is too sadly true that the retail vehicle and implement dealer has not, as a rule, made from his business the profit in money his efforts and risks justify. The underlying causes, as we view them, are not lack of good material in the ranks of dealers; neither is it a lack of effort, but rather a waste of effort, because so few have understood as they should the matter of business costs and their relation to profit. Again, jealousies and misunderstandings have made a breach as between neighbor dealers, which have invited the demoralized conditions the business has so faithfully reflected each year in our personnel. The remedy for this failure is provided by the cost educational program and the local club; both so closely interwoven that they lead naturally to each other.

"Socially we hope you will profit much from this meeting. The getting together and knowing each other by sight and name is one of the greatest boons of this convention."

Then followed the reading of the report of Secretary P. T. Rathbun:

The retail vehicle and implement trade for the coming year is of excellent prospect. There is no basic reason why business should not be good next year and profits remunerative; yet there perhaps never was a time that graver problems faced the dealer, demanding intelligent and co-operative consideration and solution. The one large question is, of course, the problem of distribution of the wares found on our floors. Dealer distribution has, through several trials and long years, proved itself to this day the most economical and satisfactory outlet for the factory product. With intensified competition and high cost of living, factories find themselves face to face with smaller margins for give and take in marketing their product, and economy and conservation is their necessity. To reduce selling cost is their effort and should be the effort of the retail dealer.

This naturally leads to consideration of why and what is a dealer. There has been some improvement in the matter of personnel of the retail implement and vehicle trade, though there is yet an annual change of an alarming percentage. The fact is, dealers are crowded too closely in territory and it would seem the manufacturer, through his annual loss account, because of failure or dsicontinuance of dealers, would have realized ere this the waste of increasing the ranks of dealers, as they have, and supplying so many new dealers, who have had no experience in the business and chosen most often because of the ease with which they are persuaded to go into business rather than for their ability or capacity to successfully conduct a retail implement and vehicle business.

This is the first year that special and definite effort has been made to enlist the co-operation of traveling men and dealers through organization in mutual betterment.

As per directions of the last convention, we entered into an arrangement whereby the association looked after audit of our members' freight bills. If there are no overcharges there is no cost to the member. If collections are made, five per cent. of the amount collected is returned in cash to the member.

There has been no material change in our membership. The hoped-for growth in numbers for the year has not materialized.

The exhibit is a most pleasing one and we hope will render you good service. The assortment as to styles and grades is very complete.

The National Federation continues to render extreme service to the various dealers, members of their constituent association. As a focusing of experience and clearing house of methods and ideas it is the greatest force for the dealer's protection and education in this country today.

To the secretary it appeals as entirely practical that the association work out a plan of aiding our members in collecting their outstanding accounts.

"Some Don'ts in Advertising," by E. S. Ralph:

Don't ever tell anybody that you don't advertise, because if you do you are telling something that isn't true. From the day that Adam and Eve in the Garden of Eden, man has been a persistent advertiser, and he will go down into his grave an advertiser to the last minute. Every minute of every day every man and every woman and every child advertises. Don't forget that. It is strictly up to you and me how we advertise. Our personal advertisement is the most important copy that we write, your personal example and mine. These advertisements are written in indelible characters in the brains of all with whom we come in contact. Don't forget this. There is one rule—one safe rule—to follow in this matter, and that is to set a rational, horse-sense example, to set up a high standard and keep it up.

Don't forget that advertising is a boomerang. Get that now. It is a boomerang. It always comes back, but unlike the mechanical contrivance you can't dodge it, do what you will. It depends solely on you as to whether it deals you a knock-out blow or whether it just passes along a little love tap.

The most dangerous of all is the "Lying Boomerang," for it is not content with hitting you once; it hits hard and hits often. Don't lie about the goods you sell. If any of the goods that you handle will not sell at a profit when the truth is told about them cut them out of your line and replace them with ones that will stand the truth and sell at a living profit. You cannot do successful advertising on a line of goods that will not stand the searchlight of the truth.

Mark my words carefully. You can write ads that will sell

trash at a profit, but you will have to go out of business if you keep it up. Successful advertising is the kind that sells a man an article that so thoroughly satisfies him that he tells his friends about it and this means repeat sales, and that is what you are all after. It is a kind of an endless chain.

Don't waste your advertising. Here is a subject that is large enough for a great big book. It is a subject that I am going to handle without any gloves on. Right in the beginning I make the statement that the dealer is not wholly to blame in this matter. The manufacturer comes in for his share of censure, because he has, as a rule, failed to educate the dealer as to the cost of catalogues, booklets, folders, etc. Traveling men are also at fault.

The impression seems to have been that printed matter is cheap; that it doesn't cost anything. I have heard that statement made many times. I hold in my hand a catalogue of which there was an edition of 120,000 copies and I am going to tell you what that catalogue cost per copy and why.

The cost of that catalogue was five cents apiece in that edition. It is not such a big catalogue and is printed on pretty good paper and has pretty good illustrations in it. Now that cover there was first designed by the artist and he painted it in the colors as you see it; he charged $125 for that painting. And then the engraver made the cover plates, which were $160 more; that is, the three originals of it. And then all those colors there were reproduced in three prints. And then six electrotypes were made from each one of those three color plates—and that made eighteen—and that cost $35. Now that is only the start of that catalogue. The drawings and the engravings of every machine and every part had to be made from photographs; the copy had to be written and type set and the book printed and bound.

Every manufacturer wants you to have all the advertising matter you need. He doesn't want you to think him stingy. All he wants you to do is not to waste it. Not to let it lay around under the counter unopened.

When I get on this subject it makes me mad. It makes me warm all over. What I am stating to you now is for your own good. If you are not guilty you will agree with me. If you are guilty you will, I know, look at the matter in a calm, thoughtful manner and take steps to put a stop to the practice of waste.

Remember this: Someone is obliged to pay the bills. You talk about "efficiency," the "cost of doing business," etc. Stop the leaks. If you know of a leak in the care of your printed matter, stop it. You wouldn't let your money lay around on the floor and be kicked from place to place, would you? I have been in many an implement dealer's place of business where everything was in a jumbled mass, repairs, etc., tucked away any old place. Some one would come in and ask for something. The proprietor would start to hunting around and rummaging for as long as 15 or 20 minutes before he found what his customer wanted and then the article looked as though it had been used a century, maybe more. A fine advertisement now, wasn't it? A fine advertisement! Oh, yes; the man was advertising himself all right. Such things make one sick at heart. Really it cost more in time alone to find the article than the profit amounted to. Perhaps the customer's time was worth something, and if it was not his patience was.

My attention was called to one man who came in for an engine catalogue. He called to Mr. Coleman, who started to wait on him, that he need not bother about him. He knew what he wanted and where to get it. He stepped over to the wall and helped himself. There hung a couple of nicely painted boards, about 18 inches wide by 5 feet long, that hung suspended from hooks in the wall by small chains. Holes had been made in the boards and spikes had been inserted into the holes from the back. These boards had been divided into spaces of proper size to accommodate various catalogues, folders and booklets. Holes had been neatly punched in the catalogues, etc., and then they had been hung on the spikes. A few—not to exceed a dozen of each—were right where they belonged and could be gotten immediately. That firm deserved a patent for this device and the everlasting gratitude of the implement trade.

Have system of the simplest kind about your place of business. Make every move count. These are the things that reduce your "overhead" expenses and pay a mighty big dividend in the way of advertising.

Don't fail to co-operate with the manufacturer. The manufacturer is always anxious to assist the dealer.

It is customary with the Tri-State Association for delegates from the states of Ohio, Indiana and Kentucky to gather in separate parts of the hall and each to nominate a vice-president, director, delegate to federation and an alterante. This was done and the following officers were elected:

Ohio—Vice-president, E. H. Huffman, Columbus, O.; director, H. C. Otterbacker, Wellington, O.; delegate to federation, Jos. H. Goldkamp, Lancaster, O.; alternate, H. C. Otterbacker, Wellington, O.

Indiana—First vice-president, T. L. McCarty, Fort Branch, Ind.; director, Wm. J. Bulleit, Cordian, Ind., to succeed President-elect McGeorge; director, G. B. Wagner, Jasper, Ind., two years; delegate to federation, W. G. McMaken, Ft. Wayne, Ind.; alternate, Chas. Hallowell, Ridgeville, Ind.

Kentucky—Third vice-president, Leo. W. Goss, Louisville, Ky.; director, R. J. Lyons, Campbellsville, Ky.; delegate to federation, T. J. Turley, Owensboro, Ky.; alternate, Fred O. Neutzel, Louisville, Ky.

DEALERS' SHORTCOMINGS AS MAKERS SEE THEM

1. Too much demand by dealers for help (personal and financial) at openings, special sale days, catalogs, advertising, and donations for many local enterprises.

2. Too much cancellation of orders—even of goods specially stencilled, and placed in transfer houses, awaiting shipment.

3. Insisting upon cash discounts, long after cash discount date.

4. Failure to pay interest on overtime taken, ignoring of terms on repairs or other cash items.

5. Failure to report shortage or breakage on receipt of goods then making claim long afterward, and expecting shipper to make claim upon railroad company, but forgetting to send freight bill with proper notations.

6. Failure to get written order from customer, or not settling on delivery, leaving dealer and factory at the mercy of the customer, if he demands concessions.

7. Too much demand for carrying over unsold goods.

8. Returning goods, without authority, to factory or transfer house.

9. Expecting too much help from factory in selling, setting up and settling. Things dealers should do themselves, as a rule.

10. Making repairs and charging more than factory price for the part.

DOINGS OF CARRIAGE MAKERS' CLUB

In Cincinnati at a meeting preceding the dinner of the Carriage Makers' Club, the committee that took up freight and classification rates with the Interstate Commerce Commission at Washington reported that the southern minimum rate would not be increased. The new South Vehicle Association, in a letter to the club, reported progress. This association was formed to protect credit, and the carriage makers' clubs of this section of the country may soon form a similar organization.

The class in drafting of the Ohio Mechanics Institute, to which the club has donated funds, will number 15 this term, an increase of five over last year.

SPRING SUSPENSION

The varieties of methods of hanging off bodies on spring supported frames, and the spring fastenings, afford at least a curious study. It illustrates the saw of there being more ways to kill an animal besides choking it with butter. It also shows what a difficult feat it is to make a passenger in a rear seat comfortable when you place him directly over a bounding axle.

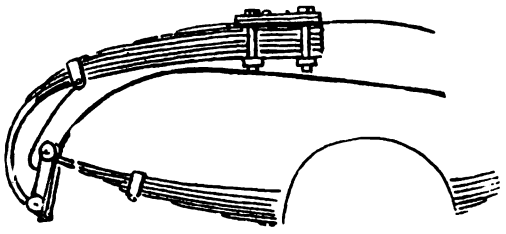
There has been a great advance in the art of spring making since these difficult problems have been brought forward, and the spring maker should receive much credit for supplying the quality of spring that is able to stand the severe stresses the motor carriage has imposed.

There are several types of suspension for springs, and a great variation in detail.

Some of the very heavy cars use the platform suspension. It produces excellent riding qualities, is sturdy, but quite heavy. Good types are the Peerless, Lozier and Cadillac.

The three-quarter suspension is also much in use for heavy and semi-heavy cars. In the interesting item is the practice of clipping to the frame. Good types are the Pierce-Arrow, Winton and Locomobile.

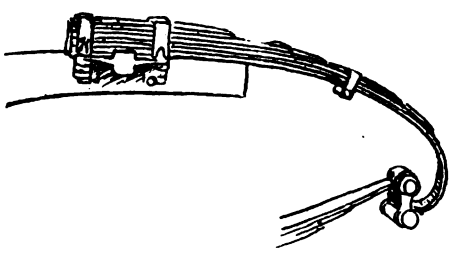
In the Winton car the rear ends of the main frames are extended backward, but not to carry the springs; they carry



Winton

between them the big rectangular gasoline tank. The stub ends of the upper spring members are clipped under the extending ends of a transverse plate riveted to the top of the frame at the rear end, the plate not only serving to hold the springs but also to stiffen and brace the rear of the frame. Two clips are employed, spaced well apart to withstand the leverage of the always prying springs. There is no bolt, so no weakening bolt hole through the center of the spring, the leaves being held in right relative positions by nibs stamped in the leaves.

The Locomobile is typical of another class of three-quarter elliptic rear spring attachment. While the springs are clipped to brackets on the frames, the brackets are just plain spring brackets and nothing else; they are heavy, forged right-angle

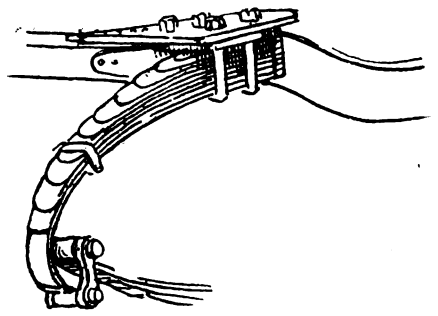


Locomobile

brackets riveted to the frames so as to form little shelves that are about flush with the frame tops. The springs are clipped to the tops of the brackets, and not to the under sides as in the style of construction already referred to. Except for the fact that the brackets are carried a little higher with relation to the frames to which they are attached, the same construction is employed in the Haynes.

The extended gusset plate is used in the Pierce-Arrow, springs being clipped under the lugs, but the plates forming the brackets are comparatively short—just ordinary size as they are not depended upon for strengthening the frame. It has been found that the body can be lowered several inches by hanging it off where the springs are above or alongside the frame. It also has an advantage of bringing the weight close to the wheels, where the load can be better axle-supported.

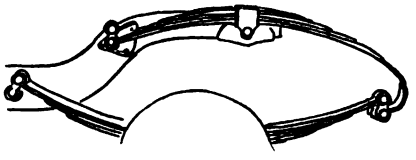
An interesting suspension is shown in the seven-eighths



Pierce-Arrow

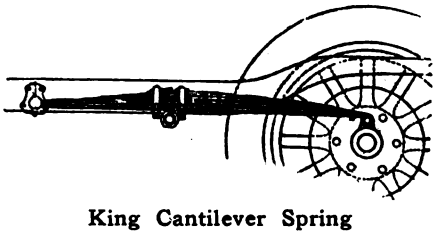
elliptic used by Panhard on the lighter class of bodies. On heavy work the three-quarter springs are used. The seven-eighths has special fastening, the axle being the only place where the spring is firmly anchored. The front ends of both upper and lower spring parts are fastened to frame with bolts and shackles. The arrangement as shown in illustration makes for an easy riding hanging, as there is play at so many points with much effective length of leaf-play of springs.

A form of spring suspension that is different is that in which



Panhard Seven-eighths

a single rear spring on each side is employed, with the rear end shackled to the rear axle, the front end pivoted to the car frame and the middle also pivoted to the frame, so that no part of the spring is fixed and every inch of it is free to yield all the elasticity it possesses. This system is known as the Lanchester, and is used in England by the car of that name as well as by the King in this country, and by the Edwards-Knight. Owing to the peculiar method of hanging the spring the forces acting upon it are applied in the reverse

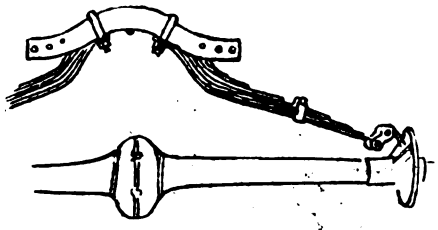


King Cantilever Spring

of the usual direction, and so the spring is reversed—the long main leaf on the bottom. These springs possess a peculiar action that mitigates the discomfort of riding in the rear seat.

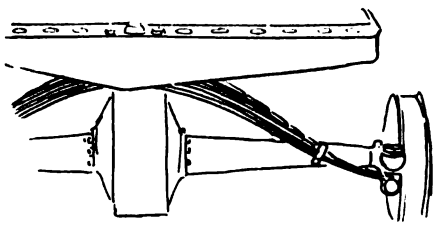
For small cars of light weight there has been evolved a spring suspension system that is as admirable for its simplicity and strength as for its really easy riding qualities—the single long cross spring with its ends shackled to the axle close to the wheels, where the weight best can be supported, and the middle rigidly bolted to the frame. The Ford and the Hupmobile present excellent examples of the single cross-spring

system and are in agreement as to the general application of the principle, though they differ in their details. In the Ford the rear cross member of the frame has a deep upward curve in the middle, corresponding with an arch formed in the middle of the spring; the arch in the spring fits into the channel



Ford Rear Axle

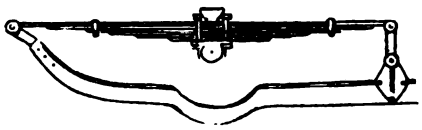
of the curved frame, where it is securely held by a pair of clips, while the ends are shackled to brackets formed in the axle casing very close indeed to the wheels. This wide spacing of the spring shackles and the consequent light loading of the middle of the axle is in no small degree responsible for the fact that a very light axle can be used without undue strain. In the case of the Hupmobile the spring is carried well back of the axle, a pair of rearwardly extending brackets serving as connecting points for the end shackles, the middle of the rear



Hupmobile Construction

cross frame coming directly over the spring, to which it is bolted. The frame of the car, of course, projects further to the rear than that of the Ford.

In the underslung car, in which the frame hangs under the axles, while in some cases the springs also are below the axles and in other cases above, the springs are semi-elliptic or practically flat. In the American and the Regal cars the springs are slightly curved and, together with the frames, are below



Norwalk Underslung

the axles. In the Norwalk the springs are normally flat and are above the axle. A further difference is that in the American and Regal the springs are shackled at both ends, while in the Norwalk only the front end is shackled, the rear end being pivoted to the upturned rear end of the frame. In all three there is a deep drop in the frame just under the rear axle, giving clearance for movement between frame and axle without bumping.

THE FORESTRY QUESTION WELL AND TERSELY PUT

Carefully read this condensation of a speech by Henry S. Graves, U. S. Forester, before the National Conservation Congress. Referring to the attitude of the present administration as to the so-called states' rights policy, which has advocated state instead of federal control of forests, Mr. Graves says there is no thought of any change in the established system of federal ownership and control. He spoke in part as follows:

The nation has an important stake in forestry. Here, as in all other countries, the real development of forestry began when the government took up its practice. Even today some persons would leave the forests entirely to private owners, others insist that the public phases of forestry are altogether a state function and federal activities in this field uncalled for. Those who hold this view are usually either lukewarm concerning the need for forest conservation or opposed to restricting private activities. Yet unrestricted private exploitation of forests is impossible if we are to continue to have the forests that the nation needs.

National responsibility in forestry is perfectly clear cut. There need be no confusion with an equally clear cut responsibility of the states. And as to private forestry little of value has so far been done that has not been an outcome of public action through state or federal agencies, or both. The national work will always be the backbone of American forestry, not trenching on or interfering with state work or individual efforts but serving as a guarantee that national needs which individual states can not meet will be provided for on a national scale.

Underlying the forestry problem are two fundamental considerations which should be emphasized and reiterated until thoroughly driven home. One is the public character of forestry. Both in the matter of a continued supply of forest products and in that of the conservation of water resources the public welfare is at stake. Secondly, stability of policy and permanence of ownership are essential to any successful attack on this great conservation problem.

I am frequently asked as I travel about the country whether I am going to make important changes in forestry policy. I was asked that very often in 1910, when I first took office. I am asked it often this year. My answer is that what we are seeking is not changes but the development of a permanent public enterprise with consistent and stable policies. The national forests were set aside in the recognition that the bulk of these lands should be handled permanently under public protection and control.

The aim of the present administration is not to overturn, but to take every possible step to increase efficiency of the organization, to adjust difficulties, and to advance as fast as possible the purposes for which the national forests were established. Secretary Houston recently said to me:

Establish permanent boundaries. Classify your lands; segregate the agricultural land and fix right limits for what is needed as protective and productive forests. Develop permanent policies based on full recognition of lasting public interests, and settled forestry practice fitted to the individual needs of each forest and locality. Study efficiency; make any changes necessary for this purpose, but make no changes that are not clearly called for in the public interest. Carry out your plans for the development and increasing use of the forests; but, above all, make each forest work for community upbuilding and local as well as general welfare. We must always have in mind the men and women who are building up a new country and laying the foundations for prosperous, thriving commonwealths. We must try to study their needs and see where and how the forests can help them. But we must not cease to guard effectively against the evils of private privilege and monopolistic control of resources now the property of the public.

MOTOR COMPANY INCORPORATED

The Trebert Rotary Motor Co. has been incorporated for $150,000 to manufacture a motor invented by H. L. F. Trebert, which, it is said, will revolutionize automobile power plants. Mr. Trebert had been at work on the motor for years and only recently completed his experiments. The headquarters of the company will be in Rochester, N. Y.

ACTION OF ROADS ON SPRINGS

There are so many factors entering into the action of springs on the road that it is impossible to obtain reliable data from the action of the completed car.

It is known that the formula for calculating the time of the single swing of a pendulum of a given length will give the time taken by a spring under load to move from its initial position to the full extent of the deflection due to the falling load, and to return, the length of the pendulum, for purposes of this calculation, being the distance traveled by the end of the spring from its initial position to that of equilibrium under load. To state the case in another way: if a pair of springs, having a compass of 6¼ ins., are deflected when the full load is upon them and they are at rest, in equilibrium with the load, a distance of 3⅜ ins., this distance will give a time equal to the time taken by two motions, one down and one up, of the spring (due to the sudden application of the full load when the spring is at its initial compass), and at the rate of 104 such double motions per minute, the number of motions being found by experiment. This is often referred to as spring periodicity, and is held by some to be accountable for the comfortable running of the car, and by others for the bumpy nature of the roads.

As a matter of fact it has nothing whatever to do with either. The time period varies on the same spring with the deflection, and this is varied with the load carried at the time. The time periods of the spring on a motor omnibus may vary a dozen times between points, and no two of the omnibuses may have the same period at the same time. If both ran full all the distance, the time period would be constant, but this would not affect the road, for the speed of the buses would vary according to the other traffic and the nature of the road. The "critical speeds" of the bus would be about 11 and 22 miles per hour, and if the wheel dropped into a hollow in the paving, or passed over a projecting gully plate at the moment when the spring was deflecting to its full extent, there would be an added impulse to the rebound of the spring, sending the load upwards, and causing it to deflect the spring to a greater extent on its return.

Fortunately, the bumpy places in the roadway are too close together for the combination of circumstances necessary to produce severe jolts to be of frequent occurrence. The usual work of the spring is done at about half of its possible rise and fall; that is, when the car is running the spring is acted upon by the road irregularities and is deflected further than what is due to the standing load for a short distance, and returns a similar distance, and, if the period at which the spring is then working (due to the extent of the load) is a slow one, the bus being fully loaded, the motion is not disagreeable; but if the period is a quick one, the bus being nearly empty, the motion is very disagreeable. The springs of all vehicles have to be of sufficient strength to carry a full load, and, if any speed in excess of 15 miles per hour is to be traveled, they must have a reserve margin to resist twice that weight before their breaking limit is approached. There is a point at which they will break rather than deflect further; but this is generally beyond the clearance allowed by the chassis builders, the frame dropping on the axle first.

The reason so many springs are uncomfortable is difficult to define, for the factors arising from the conditions of suspension and use vary in nearly every case. The great majority of the springs in use are at their best when they are deflected only part of their full capacity; that is, a spring of 6¼ ins. compass will be most comfortable when it is deflected under the normal load more than 1½ ins. and less than 2½ ins., all other things being equal.

The natural period, deflection and rebound of such a spring would be about 120 per minute, and the "critical speeds," with wheels 820 mm. diameter, would be 11.5, 22.10 and 33.15 miles per hour, and, if the wheels were not properly balanced (and very little would be required to put them out), there will be disagreeable bumping on level straight roads at these speeds, for the wheels would "range themselves" to strike the ground at the same moment as the spring was deflected and most susceptible to impulses. Any slight inequality would set the springs in motion, and it would be kept up indefinitely.

If the wheels were much out of balance, the effect could not be damped down by the springs in the distance—8½ ft.—run by the wheel, or the half-second of time between the impulses.

If the action of the springs affected the roads by raising bumps or causing depressions, these could only be created upon a perfectly level road. There are some roads—not many—on which there is a very heavy mixed traffic, which have been laid down for upwards of ten years, and yet are not in a bumpy and broken up condition, ridged or waved. So that, given a perfectly sound and well-laid road, the springs of the vehicles will not cause bumps.

At the "spring periodicity" named—120 per minute—the critical speed for cars, having the standard sized wheel recommended varies from 10 miles to 14 miles per hour. The distance traversed by the several sizes of wheel per revolution varies from 7 ft. 4 ins. to 10 ft. 5 ins., so that, with such a variety of distances between the points of spring deflection, it is impossible to obtain constant points of the road on which bumps or depressions are to be found.

THE SUSPENSION OF MOTOR CARS

Whenever I read a contribution on car suspension and, as would appear inevitable, reach the stage where the terms "periodicity" and "amplitude" are marshalled forth, I always imagine I can see a smile on the face of many readers, and yet few realize the great role played by these terms in the springing of cars, the effect upon the comfort of passengers, and the life and running cost of the vehicle.

This contribution is the result of a careful study of one termed "Action of Roads on Springs" (in this issue), particularly on account of the statement that "the time period of a bus spring may vary a dozen times between points—in support of this claim "laboratory tests" are adduced as a kind of incontrovertible proof of the accuracy of the statement.

I have always felt respect for the student who in the seclusion of a laboratory evolves the solution of interesting problems, and I therefore invite your readers to step with me on to the ordinary diving plank of a swimming bath and to let us try, watch in hand, singly, jointly, and with the addition of further readers, first gently and then more violently to swing this board. I am able in advance to give an accurate forecast of what will happen: we shall in every instance manage to swing the plank a given number of times per minute, neither more nor less. The movement, when we shall rock violently, will certainly be faster, but there will always be the same monotonous uniformity in the number of oscillations produced and producible each minute.

The experiment will end when one of your readers, endeavoring to disprove the theory, will try to rock the board faster, with the result that he will be shot off the board and land in the water.

Still further to illustrate my argument about the immutability of the periodic swinging of a given elastic body, I will describe an apparatus. It consists of a spiral spring to which a metal ball is fixed and to which weights may be conveniently added.

According to the idea the ball without any additional weight would point to zero, and with the addition of, say, 1 lb. would stretch the spring so much that the pointer would be against any figure 1 on a scale.

The substitution of this weight by one of double the weight would stretch the spring to another figure on the scale and so forth until the elastic limit is reached, proving that the deflection of a spring rises in direct proportion to the load at rest.

Now, if the weight is removed and the ball forced down to point 1 on the scale, equivalent to a 1 lb. pull, and then released, it will rise beyond zero to a point on the scale noted by the figure 1 and redescend, etc., the extent of this oscillation motion being the "amplitude" of the spring and the number of such oscillations per minute the "periodicity" of the spring.

The periodicity will remain the same if the ball is pulled down to mark 2 on the scale, the velocity of the movement, however, being double that of the former case, and thus the work required to overcome the resistance of the elastic body be four times as great, proving that "the energy of the oscillating movement rises to the square of the amplitude."

Applied to the springing of vehicles it becomes evident that the speed of the vehicle, variations in load and road surface practically make a predetermined perfect suspension an impossibility, and that a construction adapting itself to average conditions is the nearest possible approach to proper springing.

But the difficulties with which the spring designer is beset do not by any means end here. There are necessary restrictions in the dimensioning of the laminated spring as to length, strength and camber, but by far the most difficult and, in reality, insoluble problem is to design a spring of such periodicity as to correspond with the rapid succession of impacts which a fast car has to override. Before the spring can properly yield by deflection and recover in readiness for the next shock, other succeeding impacts will pile up in rapid succession, and a kind of tremor is the only expression of response which such a spring can offer.

This explains why spring makers, after years of vain effort, have abandoned the former generous camber, allowing for proper deflection and sacrificing even that essentially beneficent factor of the composite spring, that of shock absorption by friction between the leaves, have arrived at a spring of little, if any, compass, of such strength as almost to make it knock-kneed and on which the frame no longer rests but is suspended.

But, if such a spring will allow a maximum deflection of, say 2 ins. (partly up to and partly beyond the straight line), the question naturally arises as to what becomes of any shock having, for instance, the power to deflect such spring to, say, 4 ins., for we must always presuppose that the ideal suspension is one where the frame is unaffected by the up and down movement of axle and wheels, these latter independently following the contours of the road surface.

Is it not evident that such excess of movement must be compensated for somewhere, and does it not follow that it will exhaust itself in an impotent wrenching at the points where the spring is suspended—such effort taking the shape of tremors shaking the spinal column of the live freight, disintegrating the material and, by the very fact of being less perceptible, acting all the more treacherously?

In selecting the example of the diving plank I desired to illustrate one method of car suspension, where the wheels fixed at the end of the spring represent the load at the end of the plank. Obviously the identical conditions, detrimental and otherwise, exist in this as in any of the other methods of suspension with possibly one further adverse factor that the wheel, being directly attached to the spring, does not benefit by the relief which the ordinary spring shackle affords.

Reverting to my previous argument regarding the insufficiency of yield by deflection, a little consideration will direct us towards the only remedy for such conditions. It obviously matters little whether the center of the spring, where it is clipped to the axle, is able to rise with the wheel or if, by removing the shackle which fixes its end to the frame, we enable the whole spring, pivoted on the frame with its front end, to move bodily upwards; this extra movement can thereby be given, and it remains only to provide a suitable slide for the spring end and, of course, some resilient resistance to such upward movement, which resistance, in fact, has been furnished by the devices known under the collective name of "shock absorbers," which certainly have done a great deal towards a mitigation of the adverse effect of flat camber main springs.

The selection of the proper device for a specific car requires, however, a considerable amount of discrimination. The addition of an auxiliary spring amounts, to all intents and purposes, to an elongation of the main spring with the result of a lower periodicity for the latter. Unmechanical devices will greatly accentuate the rocking and swaying of the car and affect its stability in running. The very fact that the upward and downward movement of the otherwise free spring end has to be conveniently controlled by a sliding arrangement calls for a device of such strength as will last.

In conclusion, may I refer to what your contributor calls the "critical speeds of a car"—the very fact that he finds them to be the multiple of a mile unit of 11 shows that it results again from the rhythm of oscillating movements overlapping one another at certain intervals, and being, thereby, sufficiently accentuated to become obnoxious. They really occur when the rhythmic rise of the load synchronizes with the commencement of the contraction movement of the flat spring with possibly the further aid of a similar "bucking" tendency of a springy pressed-steel frame.

However, these detrimental factors may, in my opinion, be considerably, or even totally, eliminated, when cars will be suspended in a more rational and scientific manner than has been the case up till now.

ACTION OF SPRINGS ON ROADS

Having been responsible for a suggestion that the comparatively regular sequence of holes or waves in roads is caused by the periodic movement of the springs of vehicles traveling along the surface, the writer was naturally interested in the articles in The Motor (see action of Roads on Springs), and especially so when the conclusions were drawn from a series of experiments that the writer of the article had undertaken in a laboratory. (See Suspension of Motor Cars.)

He seems to have considered or concluded, because these holes were not exactly equal in distance from each other, and thus comparable to the movement of the springs tested as he had tested them in the laboratory, that they were in no way due to "spring" movement; also, having compared a spring to a pendulum, one must be inclined to think he considers that whatever shock is given to a spring, the up-and-down movement is precisely the same. But a spring cannot be compared to a pendulum, on which gravity is the controlling force; the spring is not wholly controlled by gravity but by the reactionary forces contained in the spring itself. If a sudden shock is given to a spring, it reacts with equal suddenness. Then the shocks given to a spring are due to a momentum and not only to weight, and so speed is a factor. The periodic movement is therefore a varying movement but constant for any given force. In consequence it cannot be claimed, because the depressions in roads are irregular, that they are due to "spring" movements.

It must be admitted that the spring when depressed lower than the normal for the load is conveying through the wheel to the road a weight greater than the load, and equally, when it is in its opposite condition, it is conveying less than its weight through the wheel to the road; this must have its effect upon a road structure that may be strong enough to resist the load but will not be strong enough to resist more than the load.

The action of a spring may be graphically shown by a sinuous curve gradually diminishing; if the shock is slight, the curve above and below the normal cutting the center of the curve is small.

If the shock is large then the curve above and below the normal is somewhat larger, but tapering off. In consequence, when a road is new and in good, sound condition, the portion which is unable to withstand the slightest increase of weight becomes weaker and develops a depression, with the result

that a little further on—usually about six to eight feet—a second depression begins to make itself apparent, and as the depression becomes a hole and the shock becomes greater, the second depression becomes the third, and one nearer to the first is developed and becomes the second. As a vehicle traverses these depressions, there is a lowering of speed and momentum and a tendency to keep the motion of the spring more even. The driver sees this and drives accordingly; thus the holes become somewhat even and regular—and it is especially noticeable where one class of vehicle only traverses the road. If a vehicle runs over these depressions at a higher speed than suits the motion of the springs, the result is that a shock comes on the springs before they have completely recovered from their previous shock, and bumping occurs, which makes riding most uncomfortable.

In a road which was suddenly submitted to a very large number of taxicabs from an adjoining garage the action described was precisely followed. The road had previously easily withstood the ordinary traffic for many years, but within a few weeks holes began to appear about six to eight feet apart; then they came closer, and were only about two feet away from each other. Afterwards the surface was altered to a bituminous mixture, and now it remains even and regular. The amount of adhesion required to retain the stones in position does not seem to be very great—in fact it has been shown that one inch of bituminous material will satisfy the requirements, and even a coating of tar will prevent these holes from appearing so long as the tar retains its adhesive properties.

It is this conclusion that is encouraging road engineers to find a thin coating of material that will last longer than tar and be comparable in the period of its life to the cost of tar. If, on the other hand, the cause of this waviness and depressions was due to some other action than the motion of the springs, it would have to be discovered and remedied in a more drastic manner than is suggested above, and would thus probably prove much more expensive than is likely to be the case under the theory I have advanced.

FIGURES ON OVERSIZED TIRES

It has been shown time and again that overspeeding is one of the worst enemies of the rubber tire, because of the continued distortion to which the rubber is subjected. The rubber compound does not have time to recover from the shock before it hits the road again, and often the distortion is permanent. Equally as important as the question of speed is the proper size of tire for the load it is called upon to carry. It stands to reason that for a given weight of car the larger-sized tire will stand the greater amount of wear. But the percentage increase of the life of the tire far exceeds the increase of cost as well as that of the amount of rubber. In short, oversized tires are proven beyond any doubt to be a great economy.

The figures in the following table are taken from five different pleasure cars before and after equipping the wheels with the larger tires. In each case both the front and the rear wheels were of the same size, and not only was the capacity increased as indicated, but the life of each set of tires was lengthened to more than compensate for the extra cost.

Tire size.	Capacity.	Oversize.	Capacity.
30 x 3	1400 lbs.	31 x 3½	1700 lbs.
32 x 3½	1800 "	33 x 4	2900 "
34 x 4	3000 "	35 x 4½	3700 "
36 x 4½	3800 "	37 x 5	4400 "
36 x 5	4300 "	37 x 5½	5100 "

Here it is seen that the larger equipment resulted in an increase in the carrying capacity of the car of nearly 25 per cent.

Again, consider the standard car equipments. It is regrettable, but none the less a fact, that some car manufacturers are inclined to place tires of too small size on their cars when they are sent out from the factory. The table below presents data taken from four American-made pleasure cars noted for their poor tire service, the names of the cars in question being designated by letters. The third column gives the capacities with the tire equipment as ordinarily supplied, while the last column indicates the capacity which would be realized by the adoption of oversized tires on the same rims.

Car.	Tire size.	Car weight.	Tire capacity.	Oversize.
A.....	32 x 3½	2335 lbs.	1800 lbs.	2900 lbs.
B.....	36 x 4	3450 "	4300 "	3900 "
C.....	36 x 4½	4100 "	3800 "	4400 "
D.....	37 x 5	4675 "	4400 "	5200 "

These figures require no further proof of the advantages gained by the adoption of tires of adequate size.

It should be remembered, however, that an oversized tire does not take care of abuse and overspeeding. With pneumatic tires it is found that a car which averages 20 miles per hour and never exceeds 30, will realize fair service even with undersized tires. Such a car often runs 4,000 miles on one set of tires, but by running within the above speed limits on oversized tires the same car should give at least 5,000 miles of service. In exceptional cases, a set of oversized tires has been known to give a mileage almost double that of the old equipment.—India Rubber World.

FAULTS OF MOTOR BODY CONSTRUCTION

Alteration is not necessarily improvement, and a new season's design may often be a less desirable acquisition than an old one; this particularly relates to body design. The so-called streamline design is the thing today, but it is doubted if it is so comfortable and convenient as many of the bodies of three or four seasons back, and, although it may present a cleaner and more pleasing aspect to the eye, if it is less comfortable to travel in it is really no improvement, for, after all, the majority of motorists do not buy their cars for other people to look at, but for comfortable enjoyment.

We follow fashion slavishly, where our common sense, if we thought at all, would dictate departure from it. This matter of motor car body design is one of them, and having arrived, by a process of evolution—generally copying a bit here and a bit there, and exaggerating an idea put forward for a specific and not a general purpose by a rival—at the streamline body of today, we enthuse over it, and nobody thinks he has a car at all unless he is up-to-date with the new creation.

In the course of time, the inefficiencies of the new designs present themselves to those who use them, and give vent to views of little immediate purpose, for, in spite of deficiencies, every fashion has its day.

Something over two years ago the high side door began to assert itself. But the vast majority of cars are still like furnaces in the forward seats, if the atmospheric temperature rises above normal. Then, following the lead set by the racing man, seats have been lowered to the depth of absurdity, until one has fairly to drop into them, and it requires considerable effort to get on one's feet again, and, while the fashion of a year or so ago in regard to two-seated cars—in which the driver was made to look like a small child in a slipper bath—has been, to a large extent, dropped, its place has been taken by a cutting down of the backs and sides in the interests of the streamline effect, with the result that riding for any time in a modern car has become tiring.

Quite recently a writer spoke in no unmeasured terms about the great inconvenience experienced by the driver of a modern four-seater, on account of the seat being pushed up so close to the steering post that it was impossible to sit without a cramped leg, as well as being a matter of acrobatics to wriggle into the seat below and behind the wheel at all! And he pointed out that, in the case of the owner-driver, the man had the worst seat, and could not enjoy his purchase to the full. He admitted that, in this particular matter, there was little to complain of in the same maker's two-seater, and that this cramping of the front seats on the four-seater was due to the provision of wide doors to the back seat, which, he contended,

were hardly required; if their provision means spoiling the comfort of those in the front seats. As a matter of fact, it really requires very little clear space to enter a car.

Most cars (not speaking of big cars) today have a wheelbase of 9 ft. to 9 ft. 6 in. About seven years ago I built a very comfortable five-seated car on a 7 ft. 6 in. wheelbase chassis, and there was quite room enough to get in and out of the back seats by the narrow side doors which were provided, although another three inches might have been better, writes H. Sturmey, in Motor. But then there was no waste space between the rear seat and the back of the front one (which there is in most cars of today, in spite of the cramping of the driver), for I could stretch even my long legs straight out, quite comfortably, without scratching any paint off. As a matter of fact, these very wide doors and entrances were called for by the ladies when "full" skirts and "picture" hats were in vogue; but, with next to no skirts at all and hats of moderate size, as things go now, the very wide door is no longer needed; having arrived, however, they remain, although the reason for their introduction has disappeared.

And then there is the "scuttle dash"—another introduction which, carried to extremes, introduces more disadvantages than will counterbalance the benefits it was designed to provide. It accentuates the heat-retaining properties of the high side doors. It, combined with the screen carried back to within six inches of one's nose, does much to deprive the occupants of the front seats of that volume of fresh air, the enjoyment of which used to be—and should be—one of the chief attractions of motoring from a hygienic point of view. It is often the cause of one's getting unpleasant knocks when entering or leaving the car, and it renders both these operations matters requiring some circumspection and care; while, as constructed in some cars, it buries the instruments which are carried on the dashboard to such an extent that they are next to invisible on a dull day or at night, so much so that special illumination becomes necessary, and even then it becomes almost an acrobatic feat to observe them and drive the car properly at the same time.

In the late spring, the summer and early autumn, the effect of modern body design is to transform the front seat into a veritable hot-house, unendurable to most motorists.

I believe it only wants one real hot summer to cause a complete revulsion of feeling and a general rebellion on the part of motorists against the modern design of body, artistic sense or no artistic sense.

The uncomfortable low seats and the equally uncomfortable low backs, already mentioned, as well as the streamline body itself, are developments adapted from racing practice, not always for the good of the touring car. It is exactly the history of the bicycle repeating itself, and until we learn to discriminate and exercise our powers of selective design, rather than indulging in indiscriminate and slavish copying of the points of the racing car, in constructions intended for a totally different purpose, we shall continue to go astray.

LUMBER STATISTICS

Final statistics of the lumber industry in the United States for 1909 are presented in detail in a bulletin issued by Director Harris, of the Bureau of the Census, Department of Commerce. It was prepared under the supervision of W. M. Steuart, chief statistician for manufactures.

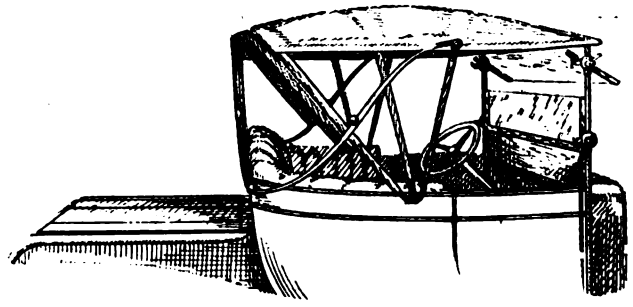
For the lumber industry as a whole for 1909 four classes of establishments are distinguished: (1) Logging camps and merchant sawmills, including planing mills, where operated in connection with sawmills; (2) independent planing mills; (3) wooden packing-box factories; and (4) custom sawmills.

The establishments in the lumber industry as a whole numbered 44,804 in 1909, had a total capital of $1,182,330,552, gave employment to an average of 797,825 persons, of whom 702,109 were wage earners, and paid out $367,863,055 in salaries and wages. The cost of the materials used in the industry as a whole was $508,215,153, which is equal to 43.8 per cent. of the total value of products ($1,160,644,628), and the value added by manufacture; that is, the value of product less cost of materials, was $652,429,475. In addition to the above products, lumber and its more elementary products to the value of $5,667,950 were reported for 1909 by establishments engaged primarily in the manufacture of other products.

The lumber industry, measured by value of products, ranked third in the United States in 1909, being exceeded only by slaughtering and meat products, and foundry and machine-shop products.

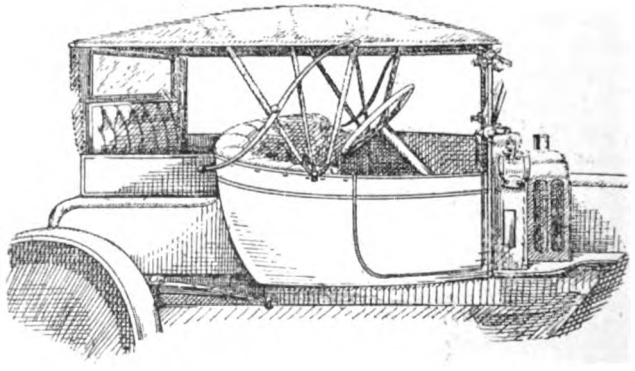
NEW HOOD TREATMENT

The illustrations show how the hood can conveniently be extended backwards to enclose the occupants of the rear seats and to bring them within the enclosed motor carriage. At the same time, the hood is so contrived that the passengers in the front seats are not deprived of their proper and due



protection when they are alone, for the rear extension is connected up with jointed hinges which withdraw the hoop-stick of the extension and place it securely alongside the rear stick of the hood proper without disturbing the remainder or presenting an unsightly appearance.

In arranging the rear portion for two extra persons a transformation takes place. The platform is fitted up as a luggage carrier and is covered with sheet aluminum, the joints being all made water-tight. On this a very considerable quantity of luggage can be placed. When it is desired to transform the car, the center portion is unlocked and lifted out, the sides



are turned up, as shown, and the back is slipped down into grooves between them, and the work is done. A door is provided, with suitable steps, on the near side. The hood being raised, the front of it is extended and locked on the windscreen standard. The rear portion is then extended and the rear curtain, with its celluloid window, fixed in the turn buttons. A comfortable seat, well protected from mud and dust, with suitable cushions and squabbing is thus provided. Side curtains can be fixed to give further protection, if desired.

C. H. A. T. MEETING

The convention of the Carriage, Harness and Accessory Traveling Salesmen's Association met this year in Louisville, November 11, at the same time as the meeting of the Tri-State Implement and Vehicle Dealers' Association. The secretary has supplied the following:

Minutes of Meeting

The twenty-third annual meeting was held at the Hotel Henry Watterson.

President Schlinger called the meeting to order at 8 p. m. and welcomed the members in a neat address.

The report of the secretary-treasurer was accepted as read and ordered placed on file.

In the absence of Ex-president Wood, the report of board of directors was read by Ex-president Huston. This report proved to be very interesting and was very well received.

The report of obituary committee was accepted and the secretary-treasurer was instructed to send suitable letters of condolence to the families of departed members.

Ex-president Huston made a motion that our next convention and annual meeting be held at Atlantic City at the same time as the convention of the Carriage Builders' National Association, which was carried.

Secretary-treasurer Nelson moved that a vote of thanks be extended to the trade papers for their aid and support. Motion seconded by J. R. Swan. Carried.

The election of officers for the ensuing year now being in order, Ex-president Huston presented the name of E. B. Williams, of New York City, for president. Nomination seconded by G. D. Lounsbery. Voted that nominations be closed and that the secretary cast the ballot. Mr. Williams was declared elected.

On motion of J. F. Hutcheson, the present secretary-treasurer was reelected by a rising vote.

The committee on nominations for directors and vice-presidents made its report and the nominees were declared elected.

No other business coming before the meeting, it was voted adjourned.

Report of Board of Directors

Your board of directors extends a hearty and fraternal greeting in this beautiful metropolis of "old Kentucky" and wishes one and all a joyous and profitable time, coupled with the hope that the coming fiscal year may be one of prosperity to you all.

By your delegation of powers, conducting the affairs of our association in the interim of annual meetings is vested in the board.

In the 22 years of our association's existence we have met in the following cities: Springfield, Mass.; Albany, N. Y.; New York City, Buffalo, Chicago, Philadelphia, Cleveland and Atlantic City, and this year we pitch our tents at the threshold of the "sunny south" and shall enjoy its warm and generous hospitality.

Your board was of the opinion it would be wise this year to join forces with the Tri-state dealers and take our banners into new territory, trusting that beneficial results will vindicate our judgment.

The commercial traveler is the architect of his own fortunes—with no human being is this more true. No avocation so soundly teaches the lesson of self-reliance and confidence.

The C. H. A. T. owes its existence and its success to the spur of the moving force of enthusiasm. For it was the unerring instinct of fellowship and recognition of strength in numbers, born of enthusiasm that impelled a score or more of traveling men to organize the C. H. A. T. at Cooley's Hotel, Springfield, Mass., 22 years ago this month, and cold indeed must be that being whose heart fails to respond to the call of comradeship and the beckoning of kindred interests as exemplified in the C. H. A. T.

Men of enlightenment without enthusiasm are the poorest kind of rubbish. Men who are not active forces for good in the world are not worth the cost of raising them and seldom do they draw a large salary.

We were meant to be "the salt of the earth"—and the first duty of salt is to season the loaf. The C. H. A. T. is the "salt" of the "traveling man."

Around the past cluster memories of happy gatherings and the communion of kindred spirits. Let us cherish these memories.

To the "old guard," the charter members, and others of later years who have so faithfully borne the burdens and responsibilities of keeping our craft sound and in good trim, we say: "Well done, ye good and faithful—stand steady and true."

Let us all foster the spirit of fellowship. Let us not ask: "What good is the C. H. A. T.?" But ask rather: "What can I do to strengthen the C. H. A. T.?" For the gain is all to the individual member.

The great bulk of sales in commerce are secured by personal solicitation. It is the personal appeal that scores heaviest. Precisely so with our association. There are two causes for failure to double our membership roll the past year, viz., lack of enthusiasm and lack of energy. The personal solicitation of an eligible friend by each member is such an easy task that we earnestly recommend our secretary be instructed to communicate with every member, with enclosed application, and urge that this be done.

The secretary-treasurer's report will show that we have enjoyed a prosperous year, and made a gain in membership of 28 active and one associate member, with a total of 271 active, 42 associate and five honorary members. We are clear of debt with a good working balance.

The Grim Reaper has taken from our ranks four of our members during the year, viz.:

Harry C. Degraff
F. M. Ruwet
A. T. A. Nelson
Hugh A. Crumley

Due respect will be paid to their memory by the obituary committee.

Again we feel it our duty to emphasize the salient features of our association—the securing of positions for our members out of employment—which could be made much more operative if members would advise the secretary of men needing positions and firms needing salesmen. This cardinal object would be grandly beneficial with proper support.

In this connection the secretary says: "We have been unable to accomplish much in the way of securing situations for members—not because we have not had calls from manufacturers, but because we have heard from but few members in want of positions. When our members are out of positions they seem to lose interest in the C. H. A. T., do not pay their dues, and seldom advise us of their needs. We have had a number of calls from concerns requiring salesmen, but with a few exceptions, I have been unable to offer them desirable material, owing to the lack of proper data."

We earnestly commend the earnest and arduous labors of our secretary, on whom the burden of work falls during the year, and who endeavors to keep in close touch with the rank and file.

The passing years are rapidly ringing their changes—changes in scenes, in times, in men, and ere long a new generation must take up the banner, when the "old guard" must lay it down.

The cost is so trifling, the fellowship so joyous, broadening and beneficial, that all in the trinity of trades represented in the C. H. A. T. should be on the roll of an organization which is free of all selfishness and greed, and whose motto is: "All for one and one for all."

We cannot aim higher, we would not aim lower.

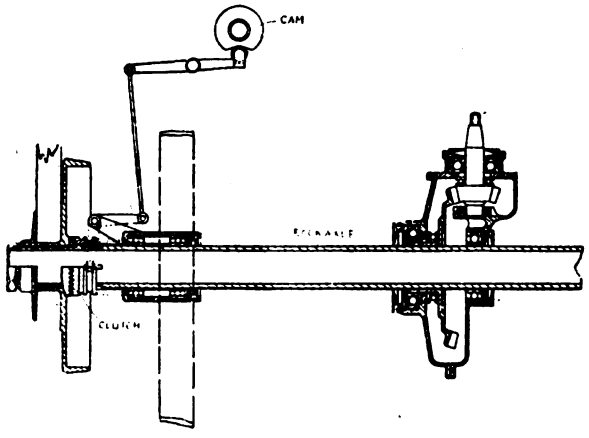
Respectfully submitted,

BOARD OF DIRECTORS.

Louisville, Ky., November 10, 1913.

SUBSTITUTE FOR DIFFERENTIAL

For large cars the differential gear as we know it today would appear to have no rival, being as it were the true solution of the tail end of the transmission gear. Even so, it has, like most good things, its weak points. In the first place it is by no means the least expensive part of the mechanism. Secondly, it adds materially to the unsprung weight on the driving tires. Another weakness of the differential, which is not perhaps so obvious as the foregoing, is that when traveling over a bad road and one driving wheel leaves the road surface the whole of the driving power is for the moment lost until that wheel again makes contact with the ground. An incidental and deleterious feature of this also is that while the wheel is off the road it is spinning round at a considerable speed, the engine being for the moment relieved of the load. Now when this wheel again touches the ground it is revolving



much faster than the speed of the car, and hence a certain amount of rapid tire wear is set up by skidding at the moment of contact.

Again, when a car becomes "bogged," the peculiar characteristics of the differential are apt to strike one unfavorably.

The unsprung weight and expense attending the use of the differential are, however, its chief drawbacks; and when considering the development which is at present taking place in connection with light motor vehicles it is not surprising that the differential, along with other parts of the car, should receive a certain amount of revision with a view to lightening the chassis and to reduce its cost of production.

An alternative to the differential has recently been patented. The idea of this new system is to eliminate the differential gear and to provide a simple and inexpensive substitute in which the weak points are avoided.

As will be seen from the accompanying drawing the back axle is in one piece, the whole of the usual differential gear, bearings, and axle sleeves being discarded.

The bevel or worm wheel which meshes with the bevel pinion or worm on the tail end of the propeller shaft is fixed directly to the back axle, and the requisite differential effect is obtained by mounting one of the rear road wheels on the back axle in such a manner that it may be readily placed out of commission as a driving wheel when it is necessary to deviate from a straight path. A convenient way of effecting this is to mount the wheel loosely on the axle, and to provide a clutch collar which is arranged to slide on feathers on the shaft, and may be moved into and out of engagement with a corresponding clutch member on the loose wheel.

The operation of the clutch collar is controlled by the steering hand wheel through the agency of a cam on the steering pillar which moves a lever connected by cable with a clutch fork. The clutch collar is normally held in engagement with the wheel to lock the latter to the axle by a spring; but when the steering wheel is turned, as when the car is negotiating a corner, the cam operating through its connections causes a withdrawal of the clutch and leaves the road wheel free. Meanwhile, of course, the drive is being taken by the other road wheel, which is permanently fixed on the axle.

For light cars especially, the arrangement would appear to have much to commend it; imposing less unsprung weight on the driving tires, while the reduction in cost of manufacture will be obvious. Moreover, the defects which are experienced with the ordinary differential gear when one driving wheel leaves the ground and when the car is "bogged" in bad ground are claimed by the invention to be entirely overcome.

DRAWING BOARD DUST CURTAIN

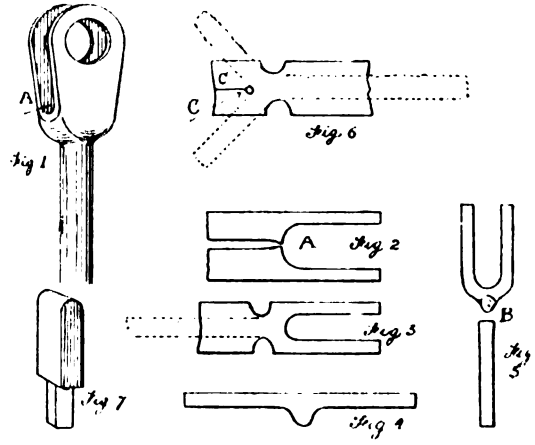
Here is described a kink for keeping dust and dirt from settling on a drawing board during the night or whenever the draftsman leaves it for any length of time. It is simply a window shade roller of about the right length to suit the drawing board. The roller is attached to the under side of the board by the usual form of brackets, and has a wire across the open bracket to keep the roller in place. Whenever the draftsman has occasion to leave his board for any length of time he simply reaches over and takes hold and pulls the curtain up over the board. This completely covers the drawing, so that it is protected from dust and dirt.

KNUCKLE JOINTS

Every smith has at times to make a connecting rod with knuckle joints on the ends such as is shown in Fig. 1. There are various ways of making them. For wagon and buggy work they may be made by taking a piece of square iron and drawing out to the shape of Fig. 2 and welding together; care being taken to leave the two points, A, slightly full, so that when welding together these two points meet first and make the job look good at the curve, A, Fig. 1.

When soundly welded, sink the fuller in the four corners, as in Fig. 3, and draw away to the size of round wanted; then shape up the lugs to the required size.

Another quick method is to take a piece of iron, say 2 x 1 in., for a medium size joint, and, with a good heat, sink into a deep



bottom swage, which makes it the shape of Fig. 4. The ends are then bent up and welded on at B, as shown in Fig. 5. This one is then also shaped to the required size.

For engine work, where the job must be strong and able to take a great strain, it is best to make them out of a piece of square stock. The square bar is fullered down on the four corners and drawn away as shown by dotted lines in Fig. 6. A hole is then punched at C, and the end is split and drawn away and shaped as shown by the dotted lines.

Fig. 7 shows an anvil tool which is almost indispensable for shaping the joint. It is made to fit into the hole of the anvil, stands up about 6 in., and is rounded off on the top the shape and size of the inside of the joint.

Paint Shop

WHAT COLORS ARE

White lead is a carbonate of lead, and has been considered the most reliable pigment used in the paint shop. But while it is considered superior to all other whites, it has the drawback of being dangerous to health.

Ivory black, or drop black, is ivory charred to blackness by heat. Bone black is manufactured in the same manner, bones being used in the place of ivory. Bone black is not so good or dense in point of color.

Lamp black is a smoke black, or soot, of a pure carbonaceous nature and fine texture, perfectly durable in color, but drying badly in oil. It is liable to spontaneous combustion if grease is left with it, or if the sun's rays are allowed to play upon it.

Chrome yellow ranges from a pale yellow to a deep orange red. The deeper in tone the better the body. Permanent yellow, of which there are two hues, light and dark, is a chromate of lead.

Naples yellow is a compound of the oxides of lead and antimony, and is supposed to have been a native production from Vesuvius and other volcanoes. Iron is very destructive to this color, on which account great care is requisite not to touch it with a steel knife, but to use a spatula of ivory or horn.

Yellow ochre, called also mineral yellow, is a native pigment, found in most countries. There are other varieties of ochre, most of them being native earths and all of which are opaque.

Yellow lake, the basis of which is alumine stained with vegetable yellow tinctures, is very transparent, and is used mostly for enriching, by glazing, browns, greens, etc.

Dutch pink, when dry, is a yellowish kind of pigment, which, when wetted, turns to a kind of brown; it is prepared by dyeing in the same manner as the preceding pigment. It is transparent but very useful in the paint shop.

Crude or raw sienna, when subjected to a high degree of heat, loses its yellowish complexion and takes on a deep brown red, and is known as burnt sienna. Although the color is changed to a rich brown, the burning process does not impair the transparency of the unburnt material.

Vermilion is a sulphuret of mercury, formed by the admixture of sulphur with that metal, and subliming them in retorts; the result is a heavy, dull cake, an inch or so in thickness, of crystalline texture, and exactly resembling in these respects the native cinnabar. When it is finely powdered it acquires the beautiful bright red color so well known. Vermilion is adulterated to an enormous extent, but the test of purity is simple. A small quantity placed on a plate of iron, heated almost to redness, will burn for a time with pure blue flame, exhaling a sulphurous odor. After the burning of the sulphur, the mercury will be entirely evaporated by the action of the heat, leaving no ash if it is pure.

Indian red is a peroxide of iron, is of good body and dries well in oil.

Scarlet lake and crimson lake are prepared in the form of drops from cochineal, and, like most lakes, have for their basis alumine or other earths. They are semi-transparent and do not dry well in oil.

Purple lake, made in a similar manner, is a good drying color.

Carmine is the finest red color known, and is made in a similar manner to the lakes. It is very transparent, and is used generally for glazing lakes and reds. In the preparation of this pigment much depends upon a clear atmosphere and a bright sunny day.

Rose pink is a coarse kind of lake, produced by dyeing chalk or whitening with decoction of Brazil wood. It is used as a ground coat for lakes; is only semi-opaque.

Ultramarine, by its brilliancy and purity of color, holds the first place in the primary colors. It is prepared from the lapis lazuli, a precious stone, found principally in Persia and Siberia. It is the most celebrated of all modern pigments, the most durable color known. The price of the article in former times was almost a prohibition for its use, but the spirit of modern commerce having supplied its material more abundantly, and the discoveries of other blue, closely resembling it in color, having furnished substitutes for its ordinary uses, it may now be obtained at moderate prices. Artificial ultramarine is imported from France, and is known as French ultramarine, but German manufacturers have produced good colors. It is made by different formulas, according to the country it comes from, but generally consists of clay, carbonate of soda, sulphur and charcoal.

Cobalt blue is prepared by mixing a pure solution of a cobalt salt with a solution of pure alum, and precipitating the mixture with an alkaline carbonate; it is a very rich color, but is soon spoiled by the action of varnish. It is transparent, and is used only as a glaze.

Prussian blue is a cyanide of iron, produced by the combination of prussic or hydro cyanic acid and iron. It is of a deep and powerful blue color, and forms tints of much beauty with white lead, though by no means equal in purity and brilliancy to that of cobalt and ultramarine—it is opaque and dries well in oil.

Verdigris is made from copper plates in much the same manner as white lead from metallic lead—great care is required when using it that water is not allowed to come in contact with it, or it will be turned to yellow. Like emerald and malachite greens, it is transparent, and dries badly in oil.

Green lake, and acetate of copper in the form of drops, passesses a good body and is a good dryer. It is mostly used for picking out.

Brunswick and Quaker greens, made from oxychloride of copper, are also very useful to the painter, and though not rich in color by themselves, are valuable as a foundation in mixed greens. They are opaque, and dry well in oil.

Umber is a brown natural ochre, a variety of peroxide of iron. Turkish umber is considered the best. It is a good dryer in itself. Like sienna, it is deepened in color by burning.

Vandyke brown is a species of bog earth or peat, tinged with oxide of iron, and is called after the celebrated painter of that name. It comes from Germany, is semi-transparent, and a bad dryer in oil.

YE OLDE PAYNTE SHOPE

The following is a picture taken from House Painting and Decorating, showing how they used to run the paint shop years ago. The prices paid for carriage painting at the present day are not such as to admit of much prodigality in the use of materials; on the contrary, it is often necessary to practice the closest economy to "make both ends meet" and keep the balance on the right side of the book. One of the sources through which no small share of the profits leaks out is the waste of colors that takes place in a great majority of shops; in fact, it may be safe to say in nearly all of them. The shelves will generally be found loaded with paint dishes, each containing more or less color left to dry up and become worthless, much of it being of the most expensive kinds, too. It is not

unusual to see a workman, having one spoke to paint, mix color enough to coat the whole of a carriage, and, after using the spoonful required, the cup containing the remainder is placed on the shelf to keep company with the multitude of its fellows already there. Again, perhaps a little green is needed for the inside of a job, the particular shade being of no consequence. Instead of mixing together what is left of two or three batches of green used on other jobs, and perhaps mixed only a day or two before, a new package is opened, and, as usual, about three times the quantity needed is mixed, the two-thirds not used being "shelved" like an unpopular candidate for office. Bye and bye there comes a body, the inside of which has got to be "slushed." This is his opportunity. All the cups on the shelves are suddenly called from retirement and their contents mingled together in a grand hotch-potch, in which carmine at $7.50 a pound and other costly lakes suddenly lose their identity among a mass of Venetian red, yellow ochre, and other plebian pigments. Whatever the journeyman may think of it, the boss who has to foot the bills will doubtless admit that this is expensive "slush." It is always best to be sure and mix enough color for the job in hand, and also to have a little left over for "patching," especially if it is a color not easy to match, but any man who has followed the business even for a short time only should be able to decide within a very small quantity just how much will be needed for any specified work, and the thrifty and careful workman will always find ways among a variety of jobs to use up all odds and ends in a profitable manner.

SOME POINTS ON PAINT DRIERS

If a drier is added to a paint that has been correctly mixed, a film should be enabled to set in about twelve hours.

The way a drier is made will depend on how the added paint will let the oil absorb oxygen with rapidity enough to answer the purpose, but not cause premature decay of the paint film. Too quick drying is likely to increase the rate of deterioration of the paint.

A drier should not cause a mechanical hardening of the paint film. The presence of free rosin, or an excess, may produce a false appearance of drying, and may cause checking.

There should be a margin of safety in the material so that too much or too little of the added drier will not be serious in the after results.

The color effect on raw oil made by addition of drier should be allowed for. Poor grade of linseed oil in a paint has much to do with "deviltries" of driers.

Cracking and checking is a defect sometimes due to want of elasticity in film, which is sometimes aggravated by excess of drier, especially of a wrong kind. Some paints which hold large proportions of oxide of zine are affected in this way. It can be overcome by use of prepared thinning and drying materials specially suited to the nature of the pigment.

Seems queer, but so it is, that paint containing too much drier often fails to dry. If oxygen is absorbed too fast by a paint film, secondary chemical actions take place which prevent the normal formation of linoxin, and these actions result in the formation of a sticky non-drying product. Same thing happens when linseed oil in bulk is exposed to the air, the well known oil gold-size being so produced.

When paint does not show any hardening habit even when much drying material is in it, but remains wet for a long time, it is sure a wrong drier has been used. Certain driers start oxidation slowly, but work fast when the process has been started. Oil that is too new or that holds suspended albuminous matter is very liable to set back or even stop the usual action of driers.

Temperature and humidity exert a strong influence on the rate of drying. At low temperatures drying is held back, or may be altogether stopped. Also, it is known that paint subjected to such influences sometimes will not dry at all normally, even if the temperature in the end becomes suitable. Moist or bad air sets back drying, because there is not enough oxygen in direct contact with the paint film to enable it to go along in a normal way.

The influence exerted by different pigements on rate of absorption of oxygen by linseed oil is very marked, and is also complex. The reason why such pigments as lamp black and yellow ochre, which have substantially no effect on linseed oil, should retard the drying of that medium, is not clear.

When pigments of this kind are in question, a drier should be used that is capable of starting oxidation quickly, and that can also absorb oxygen for quite a period of time.

MODERN FLAT VARNISHES

Many attempts have been made by varnish manufacturers to produce a varnish which, without being rubbed, will give the same effect as a rubbed varnish.

The gloss of a varnish is due partly to the resin, chiefly to the oil contained. Until about 15 years ago linseed was the oil universally used in varnishes, and linseed oil naturally dries with a gloss. A number of flat or dull-finish varnishes were placed on the market about that time, in which the flatting agents were beeswax, Japan wax, aluminum palmitate, etc., dissolved in the varnish, and the latter thinned considerably with turpentine. As all these materials tend to slow the drying and to decrease the hardness and durability of the varnish, a varnish long in linseed oil could not be successfully flatted, for the reason that to overcome the gloss of the oil so much flatting agent was required that the resulting product had no hardness or durability. Hence short oil varnishes were used, of no great durability in themselves, and of considerably less durability after the incorporation of the flatting material.

The introduction of China wood oil into general use in varnish making at about this time resulted in an improvement in these flat finishes. China wood oil in itself dries flat. In fact, for some time a great many accidentally flat varnishes appeared on the market, intended by their manufacturers to dry with a gloss, but which, because of insufficient knowledge of the way to treat wood oil, were apt, under certain conditions of ventilation, to dry flat. By substituting China wood oil for linseed in the flat varnishes some improvement was made, as more oil and less wax could be used, resulting in more durable flat finishes. Even so, however, these flat varnishes have serious defects. The wax, soap, or similar material used for flatting not only diminishes the durability of the varnish but also settles out, especially in cold weather, the clear varnish drying with a gloss. Nor are these wax flats easy to finish over.

Of all the waxes, carauba or Brazil wax would be the ideal flatting agent if it could be held in solution. It is quite hard, tough and durable, but unfortunately, while soluble in hot oil or varnish, it granulates out on cooling.

The next step in the production of flat varnishes was the employment of an active pigment which would act chemically on the acid resin of the varnish, producing false body, requiring extra thinning, and thus flatting the varnish. The oxide and carbonate of magnesium are the pigments employed for this purpose, the varnish being made from a fairly acid resin and China wood oil. When such a varnish is ground with one of these pigments, and the thick paste thinned down with turpentine, very handsome flat finishes are produced, probably the smoothest dull finishes made. Apart from the settling of the pigment—a minor fault—one thing has prevented their making greater headway. This is the fact that the chemical action of the pigment cannot be checked permanently at any given stage, but continues indefinitely, even after the flat varnish is shipped. The result is that the thickening may continue until the product is livered or solid before it can be used. Then too, the false bodying and consequent thinning means that a very thin film of the finish is left on the work, and, of course, this thin film is not as durable as that given by a var-

nish of proper body, while the alkaline pigment decreases the water resistance of the film. Other emulsions, such as tungstate of aluminum, hydrate of aluminum, etc., have been used, but without conspicuous success.

For a dead flat finish nothing can excel in durability a varnish made from a good, hard resin, raw China wood oil and turpentine, the oil and the resin being so manipulated that the oil retains its flat drying property.

The latest development in flat varnishes is in the use of East Indian resin, a semi-fossil damar containing a natural wax-like body, and drying dull. Cut cold, or at a low heat, with China wood oil, this resin makes probably the best flat finishes so far developed. East Indian flat varnishes are cloudy, due to this wax, and settle out the wax, but this sediment shakes up readily. They stand water well and are fairly durable.

The fact that there are on the market today flat finishes made on each of the lines herein mentioned is proof in itself that the perfect flat varnish is yet to be discovered. Such a finish should be of good varnish body, not carrying an excessive amount of thinness, should be made preferably from a hard resin with plenty of oil for durability, should not settle out of the flatting agent, and should not be affected by age. If such a varnish can be produced which, when applied with a brush, will dry out to as handsome and satisfactory a finish as that obtained by hand rubbing a good gloss varnish, it will be a boon to the painters as well as to the manufacturers.—The Decorator.

PECULIAR ACTION OF RUST

A rusty surface, painted, yields poor results, so the rust is removed. It has been found that a slight coating of rust, free from caking and lumps, has a certain advantage.

Fine rust is practically a pure ochre, very free, in the case of wrought iron and steel, from silica. Hence the surface is very absorbent, and if painted with a good coating of thin paint a similar result may be expected as by first laboriously cleaning the metal and then painting with a thicker paint—that is, one containing more pigment in proportion to oil than the former.

If the iron surface is sandpapered it is made much smoother, and its area is reduced to a minimum. If, however, the rust is left on as a thin coating, the underlying surface of metal in contact with the rust is slightly pitted and uneven. Hence when the paint is applied it has a larger surface to grip, and its tenacity will therefore be increased in proportion.

Five plates were allowed to rust by exposure to weather, and when a thin layer of rust had been formed (after about a week), the plates were thoroughly dried in a steam oven at 100 deg. C., weighed, and three of them finally painted while the rust was still adhering.

The remaining two plates served as blanks, being weighed, then cleaned, and again weighed, the loss in weight giving the amount of rust that had accumulated during the week's exposure. When plates had been exposed, after painting, for a sufficient length of time in the tanks, they were carefully cleaned and weighed, the loss in weight giving the total amount of corrosion. Subtracting the weight of rust present on the plates when they were painted, as calculated from the two blanks, the difference gave the corrosion which had taken place after the application of the paint. The plates suffered far less from corrosion when painted in a rusty condition than when first polished bright before painting. This is a remarkable result.

It would seem, therefore, that when the painter is called upon to protect by painting thin sheets of iron, such as galvanized iron, which has already rusted somewhat, any lumps of scale should be removed, and a coat of paint applied in warm weather dry to the surface. The danger of the sheets rusting through will thus be considerably less than if the rust is first carefully scraped off and the metallic surface polished with sandpaper before the application of paint, as is the more usual custom.

PRESERVATION OF IRON BY PAINT

In his Carnegie memoir for 1912, J. N Friend described a series of "field" tests with large iron plates instituted with the object of determining the relative values of various liquid vehicles and paints capable of being used for the protection of iron and steel. These tests were of two kinds, consisting in exposure to air and to water respectively. In the air tests, plates of wrought iron, measuring 18 x 22 inches in area, were cleaned and painted with various mixtures. They were then suspended to a specially constructed wooden fence and exposed to the continued action of the atmosphere. In the water tests, plates of similar iron, measuring 10 x 10 inches in area, were cleaned and painted in the usual way. They were then suspended, each by two glass hooks, in large wooden tanks filled with water and exposed to the open air. At regular intervals of time the surface of the plates, in both series of tests, were carefully examined and the observations noted. After the plates had been exposed for from nine to ten months, several of the paint films showed such decided signs of disintegration that it was thought desirable to discontinue the experiments. The plates were accordingly removed, soaked in caustic soda solution to remove the paint, scraped, rubbed clean with old emery paper, and weighed. The loss in weight was taken as measuring the extent of corrosion.

A careful examination of these results reveals a number of interesting facts of considerable technical importance.

1. The surface of a paint film does not always give a correct idea of the extent of the corrosion taking place beneath. Apparently the only certain method of determining even approximately the extent of corrosion lies in scraping off the paint and examining the surface of the metal beneath.

2. The addition of small quantities of paraffn wax to paint destined for the protection of iron and steel expose to the air reduces the corrosion very appreciably. If the paint is required to set at the normal rate, no more than 1 lb. of wax should be used for every 1,000 lbs. of oil present in the paint. If, however, the rate of setting is less important, the amount of paraffin wax may with advantage be increased to 3 lbs. per 1,000 lbs. of oil.

3. In the case of plates immersed in water the addition of the paraffin wax seems rather to assist corrosion than to diminish it.

PECULIARITIES OF LAC

The lac industry is among the most ancient of India's minor industry. The trees upon which the lac insect thrives best are the Kusum and the Palas trees, the latter being known in Sanskrit literature as Lakhsataru or Lac-tree. The oborigional tribes throughout India recognized the Lac-tree, and the industry seems to have an antiquity of several thousand years.

Eveidently lac-resin was used as a varnish some centuries ago, as mention is made of it in 1590, when proportions of the resin were specified for the varnishes to be used for the woodwork of public buildings. One of the earliest European writers was a Dutchman sent to India by the King of Portugal. His explorations were published in 1596, and in them he gives full particulars as to the uses of the resin, but evidently was ignorant as to its origin.

The lac insests breed twice a year. In some parts of the country the young larvae begin to appear in July and again in December. Beginning with the July generation, out of the dried-up, shelly incrustation where the female had formed her shell, minute red larvae begin to swarm and spread over the neighboring twigs of the tree. These twigs assume a reddish color, due to the thousands of minute insects moving over

them. The young do not all hatch at once, but continue to issue for as long as a month after they first appear. On leaving the incrustation, the larvae crawls to a neighboring twig and finding a soft sappy spot, buries its beak in the bark and comes to rest in this position. While this migration is going on, thousands die owing to their inability to find a suitable twig to feed upon.

As soon as the larvae come to rest they commence to suck up the sap and exude the substance which drying around them forms a shell or scale which protects them from the elements and from their natural enemies. There are two types of scale, the one ovoid in shape, the other circular. The latter is larger than the former and contains the female insect, while the former contains the male. It is the custom of the insects to feed closely together. This causes the shells, as they gradually enlarge, to coalesce and produce a thick incrustation on the branches.

During the growth of the female incrustations, which are the most numerous, structural changes are coming about in the larvae as it matures into a female insect. About two or three months after swarming, the male insects mature and liberate themselves from their shells by pushing up the lower edge and crawling out backwards. These male insects, upon getting free, crawl over the incrustations in search of a mate. Soon after pairing, the male dies, and a still further change takes place in the female. It becomes little more than a sack filled with a bright red liquid in which the eggs are formed. It is from this red liquid that formerly a dye was obtained known as lac-dye. As many as a thousand eggs are formed in this liquid, and as they mature, the mother dies, consisting at the time of little more than a skin. The larvae upon hatching issue from the shell through an opening left for the purpose or through ruptures in the skin. The brood which hatches in December is similar to that of July, except that the males are equipped with wings, which is, doubtless, a provision of nature to insure the propagation of the insect.

The method of collecting the lac incrustations is to break off the branches bearing the incrustation. This is usually done before the young larvae have swarmed, which results in the lac cells containing a large quantity of the now useless red liquid know as lac-dye. These broken branches are then sold to middlemen, who take them to the factory. In some localities the incrustation is broken off the branches, the latter being left intact on the trees.

In the factory the lac-bearing twigs and branches are broken up into short lengths which is termed stick-lac. The stick-lac is then crushed in ordinary grain mills worked by hand or by rollers driven by machinery. The substance obtained is then softened and separated into three classes: (1) fragments of the branches and twigs, which is often used for fuel; (2) fine dust consisting of fragments of lac and dirt, technically know as "khud" and sold to makers of toys and bangles; (3) granular lac known to the trade as "seed-lac."

The seed-lac is washed in water for about 24 hours, after which the lac cells are broken up and the substance reduced to a smaller and more uniform granulation. The water during this process becomes a deep purple claret color, due to the lac-dye contained in the cells.

In some parts of India, and more especially where lac factories do not exist, different methods of preparing the lac required for local use are in force. In the Punjab, the lac is boiled in water containing crude carbonate of soda and borax, or it is well rubbed in water containing a little alum and is then strained through a cloth, fresh water being added until all the lac dye has been washed out. In Hyderabad, it is scraped off with the twigs, dried and ground in a millstone. It is then mixed up in potash and water and then dried in the sun. It is still a moot point whether these native methods of chemically treating the lac do not spoil the resulting shellac.

After being washed the seed-lac is exposed on drying floors to the air and light, where it is thoroughly dried and to some extent bleached. The lac is then often mixed with orpiment or resin or both. The former makes the lac opaque and imparts to it a rich, pale straw color. This mixture is used for the manufacture of shellac.

Resin used with lac serves to lower the melting point, and is, therefore, desirable, and a certain amount, two to five per cent., is recognized as a necessity in the manufacture of shellac. Owing to the cheapness of resin, however, it is often used unduly to adulterate the shellac.

PIGMENTS VARY

Pigments vary as to their transparency. We find in making bottle green that the Prussian blue being more opaque than the Dutch pink, a much smaller quantity is required. So also is it the case with ultramarine, on account of its transparency, the addition of a very small portion of white causes a remarkable change in the tone of color, whereas a larger quantity would be required to lighten the color of Prussian blue on account of its opacity.

SHORT AND LONG PROFITS

What is a merchant's profit on a buggy? That depends upon the cost of doing business, but, in general, it may be laid down that 25 per cent. above delivered cost is about the right figure in the average locality. This should not be difficult to get, for not a few men in the buggy business get more. Their right to a larger figure is to be seriously challenged.

It is this sort of merchandising that helps drive the farmer to the mail order house. When he learns that in some isolated instances the merchant is making nearly 50 per cent. above delivered cost on the sale of a single buggy, it makes him mad. Can anybody blame him?

One dealer in the Missouri valley handles a line of vehicles that cost him, delivered, $72 per job. He sells them at $105—making a profit of a little more than 45 per cent. In spite of the fact that his gain is excessive he has been in business a number of years. His experience, at any rate, is useful to the trade in that it shows what can be done. Just such methods of "piling on the price," however, are doing more than all else to encourage direct selling.

But most of the fault with the average dealer is on the other side. He demands too little profit rather than too much. The dealer who gets more than his share is so rare that he is only to be cited as a living example of how not to do business.—Weekly Implement Trade Journal.

NEWARK AND LOS ANGELES ENTERPRISE

Phineas Jones & Co., of Newark, N. J., the well known automobile wheel manufacturers, have started a branch factory at 1625 South Los Angeles St., Los Angeles, Cal. They will incorporate there under the name of Phineas Jones & Co., of California. The business will be under the management of H. Percy Jones, who is well known to the trade.

The machinery will be of the latest and most approved type, for the business, and will be in operation January 1, 1914.

They will manufacture and do repair work on both pleasure cars and motor trucks. We wish them much success at this new branch.

QUALITY OF SANDPAPER

The quality of sandpaper may seem a very small matter, but, as a fact, there is a good deal of rubbish sold. Good sandpaper will not crack when folded double, and when the sanded surfaces are rubbed together an idea of the quality may be obtained by how readily the particles of sand are detached. Sandpaper should always be kept in a dry place. If the back of the paper is chalked it will prevent it slipping when using.

Smith Shop

SOME EXPERIENCES WITH COAL

There is no other thing in the smith shop which causes as many failures and as many discouragements as poor coal; and a most curious thing in connection with this is the fact that in nine out of every ten cases, something else is blamed instead of the coal; either poor iron, poor steel, or an unskilled workman, will be given as a cause for the failure. I can positively say that I have had more trouble with apprentices in trying to teach them the importance of good coal, and the necessity of understanding the proper way of arranging their fires for different kinds of work, than any other one thing connected with smithing, D. O. Shaw says in The American Blacksmith. Dont lay the charge of cracked steel to the bath, when it was really caused in your fire.

If we are using a coal that clinkers badly, we can readily understand how difficult it is to keep the air from working up through, and reaching the steel, and poor work is the result.

My trouble with coal began some years ago, during the time of a coal famine. The new coal arrived just as I had a rush order for some rings; one size was 4 inches wide by ¾ inch thick, and 20 inches in diameter; the other size was 5 inches wide, 1 inch thick and 22 inches in diameter. The smaller rings had grooves. There would be several grooves just about where the weld came, and consequently the weld must be perfect. The large rings were made from low carbon steel.

I placed one of the smaller rings in the fire to weld, and when hot I removed it to the anvil, but it would not weld, and on each side of the lap were pit-holes ⅛ inch deep. This was laid aside, to be cut into a smaller ring. I took another, and upset the ends so as to have something to carry back and forth on, and in spite of the extreme care and every precaution which I used, the job was a failure. I then placed a thin piece of soft iron between the laps, but no weld would result. I was then forced to report the case to the office, and after my explanation, they advised me that they would lose the order unless they could get those rings, and prevailed upon me to devise some way or means of producing them. I replied, "You get me a ton of charcoal for welding, and although it is pretty hot work, making a ring of that size in a charcoal fire, it is the only solution to the problem." The next coal I received was a shade better, and by getting my ring ready to weld, and by making a new fire, I could make just one weld, and would be obliged to build a new fire for the next.

For a number of years I used a coal which when used for a new fire was muddy and sticky, and we were obliged to spend some time in burning and drying this undesirable part off. Before putting in steel work, I sometimes mixed in charcoal to insure good results.

I inquired of a salesman the reason why we could not get better coal, and he replied, "Because it is not mined. The veins of the old coal which you have used have run out."

I was dressing over a tool one day, and threw some charcoal into the fire to soften it up. Upon noticing what I did, the customer immediately inquired, "Do you use charcoal? My father used hemlock bark, and he could do a good job."

When taking my vacations I have sometimes visited different shops, and I always noticed that poor coal was the cause of most of the trouble, though an improperly arranged fire is sometimes at fault. I remember of one instance where a young man was endeavoring to weld a bicycle crank. He took a few good heats, but the pieces would slip apart as though they were greased. Of course, the man was very much embarrassed, and remarked, "I thought I could weld, but I guess I can't." I asked, "What do you think is the trouble?" "It must be me," he replied, "don't you think so?" I replied, "That depends on how far your skill enters into the work. No one could take a better heat or handle the work on the anvil more skillfully than you. Now, if your skill goes beyond that, it must rest with you." "What do you mean?" he inquired, and I then told him that his coal was poor, and unfit for welding steel to good advantage. I also endeavored to show him how to burn and coke up his fire. He then worked the laps over a little, took a heat, and it welded nicely. He was extremely grateful for the information.

Good coal is cheap at any price. It will save a man's reputation, and it may save a confession also.

THE WHY AND THE WHEREFORE OF HEAT TREATMENT

In heating tool steel, the carbon assumes many different forms, and in heating tool steel of about .9 carbon, it goes through many changes, as outlined:

We will take as an example, a piece of properly annealed tool steel at atmospheric temperature, which we will designate as "zero." The heat will rise uniformly, until it reaches a point at about 1300 deg. F. Here the temperature hesitates and remains stationary until certain internal conditions have been satisfied, when it again rises uniformly to about 1400 deg. F., when the second transformation takes place. The temperature again remains stationary until this has been completed, and it again rises uniformly to about 155 0deg. F., where the third change takes place. These changes have been designated the "recalescent points," and we shall use them as Ac-1, Ac-2, and Ac-3.

If suddenly quenched in water at Ac-3, or 1550 deg. F., the steel will be very hard and coarse, and the metal will be held in the condition in which it was placed by the applied heat. If allowed to cool slowly, the temperature will drop uniformly until slightly below the temperature at which the transformation took place. While the heat is rising to about 1500 deg. F., the metal will slightly rise in temperature. This point has been designated as Ar-3. When the changes in the structure and grain have been thoroughly completed, the heat again falls uniformly until it reaches a temperature of about 1350 deg. F., at which point the second change takes place, which is the opposite of that on the rising temperature, and has been designated as Ar-2. After the change has been completed at this point, it again lowers in temperature uniformly to the next point, Ar-1, or about 1250 deg. F.; after this change, it gradually lowers to atmospheric temperature. These have been called the "decalescent points."

As the molecular changes are taking place, from zero to 1550 deg. F., or reaching the recalescent points, the writer will describe the actions of the metal:

As we all know, at atmospheric temperature, the carbon in the steel is in the cementite form (Fe-C3). When it is heated up to Ac-1, or about 1300 deg. F., the heat that has been absorbed by the metal, causes a partial decomposition to take place, which results in the dropping of one atom of iron, and when the metal has completely assumed the form of (Fe-C2) the temperature rises to Ac-2, or about 1400 deg. F., when it drops another atom of iron, and the carbon assumes the form of Fe-C. When this change is completed, the temperature

again rises to Ac-3, or 1550 deg. F., where the carbon goes into solid solution with iron, or the austentite form.

On the reverse or decalescent points, the action is as follows: On slowly cooling from Ar-3, or 1500 deg. F., the carbon absorbs one atom of the iron that has been dropped on the rising temperature, and the metal becomes Fe-C; while at the next point, Ar-2, or 1350 deg. F., it absorbs the second atom of iron that was dropped on the recalescent point, and takes the form of (Fe-C2); while at Ar-1, or 1250 deg. F., it absorbs the third atom of iron, and again becomes (Fe-C3.) or cementite.

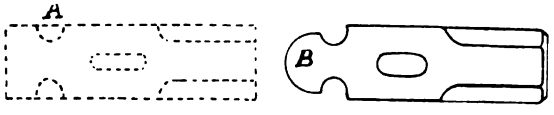
During these changes in the metal, the iron assumes three different conditions. While the temperature is rising up to Ac-2, 1400 deg. F., it is highly magnetic, and has been called Alpha iron, or "A," or ordinary soft iron, as we know it in Ingot iron or steel. At about Ac-2, 1400 deg. F., it loses its magnetism; and between Ac-2, 1400 deg. F., and Ac-3, 1550 deg. F., it is as non-magnetic as brass, and has been called Beta iron, or "B," a hard variety, as we know it in hardened steel. This change in magnetism is accompanied by a change in electric conductivity and specific heat. At Ac-3, or 1550 deg. F., another change in electrical conductivity takes place, an dalso in the metal's crystalline form. Above Ar-3, it is called Gamma iron, or "Y" iron, and is very low in tensile strength.

The question of when we must quench this steel, after it has reached the recalescent point, has been asked many times. We have found that Professors Osmond, Hall, Austin, Brinnell and Chatelier have placed the recalescent point of from .89 to 1.31 carbon steels at 690 C., or 1274 deg. F., and have allowed 30 Cen., or 86 F., as the point to quench. This point may be correct on small sections, but the writer has found that it will not do on heavy sections, and finds that a variation of 100 deg. F. can be added to the heat without doing harm to the steel, ranging from .85 to 1.30 carbon, covering tool steel for general work, and finds that steel containing 1.20 carbon can be quenched as high as 1472 deg. F., without injury to the steel.—J. A. Ridgely, in American Blacksmith.

SMITH'S BACKING HAMMER

Besides a sledge and a flogging hammer a striker should have a backing hammer, which should be about 3½ pounds in weight.

It may be made easily out of a piece of 1½-inch square steel. Take a piece about five inches long, as shown by the dotted lines in Fig. 1; and, after sinking a fuller in at A on the four corners, punch the hole and shape the other end as shown,



with eight sides, at the same time squaring the face and taking the square edges off with a swage. The peen is now shaped as in B, Fig. 2, and the hole finished off.

To temper, make the hammer hot all over and cool the face and peen off, thus leaving it hot a couple of inches in the middle. When the temper reaches a purple color it may be cooled out.

NEW COMPETITOR FOR LOW-PRICED AMERICAN CARS

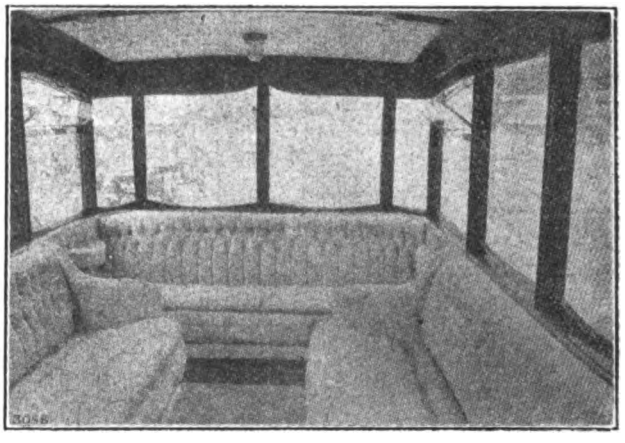
The success which has attended the introduction of American automobiles into the United Kingdom has, in one instance at least, caused British motor car manufacturers to endeavor to compete with the low-priced American car. Although the British car in question was not shown at the exhibition at Olympia last year, it has been publicly advertised that the manufacturers are prepared to supply up to 500 or 600 cars at the wholesale price, thus giving purchasers, in effect, the benefit of the agent's profit.

This new model consists of a 20 horsepower chassis, having a four-cylinder engine, with valves on one side, inclosed by plates removable by unscrewing four screws. Semi-splash lubrication is provided for the large ends, aided by pressure feed from auxiliary tank. The gear box gives three forward speeds and reverse, and the clutch, which is said to work smoothly, is fitted with red rubber facing, engaging a metal cone. The bore is 3½ inches and stroke 5 inches, and the car has worm drive and live axle. It seats four passengers and the price direct to the public from the factory, including hood and screen, three lamps, horn, tool kit, jack, pump, oil tin, and tire levers, is £165 ($803). The wheels are of artillery pattern 810 millimeters by 90 millimeters (31.8 inches by 3.5 inches) and the wheel base 9 feet 3 inches, track 4 feet 6 inches, and ground clearance 10 inches. Under the rating of the Royal Automobile Club the annual tax is $30.40. Experts speak well of the car. Although the present output of the factory is small, it is proposed to install additional machinery in order greatly to increase the capacity.

It was only to be expected as a result of the enterprise of American manufacturers in creating a large demand for inexpensive motor cars that British manufacturers would enter into keen competition with them. The competition has begun, and it is of great importance that the American makers of low-priced motor cars should maintain the general excellence of their cars, which have made such a favorable impression in the United Kingdom.

DAIMLER SALOON BUS

The Daimler example has comfortable provision for a dozen passengers. It is well upholstered, and adequately lighted. There is, in addition, an electrical self-starter for the engine. There are capacious racks for personal wraps and other small articles, and a hinged drop table is accommodated behind the driver. The entrance doors are wide, and everything about the body conveys a sense of ease. The body is of mahogany,



An interior which gives a passenger the impression of his being in a comfortable room.

with ash framing on steel, and with aluminum panels. All the inside seats or divans are upholstered in French grey figured cloth and laces, and the floor is covered with carpets to match.

The unique points of a Daimler sleeve-valve engine tell in favor of this vehicle, its equipment and scope of use, by reason of the smooth and even pulling at all times, and of the elasticity in top gear.

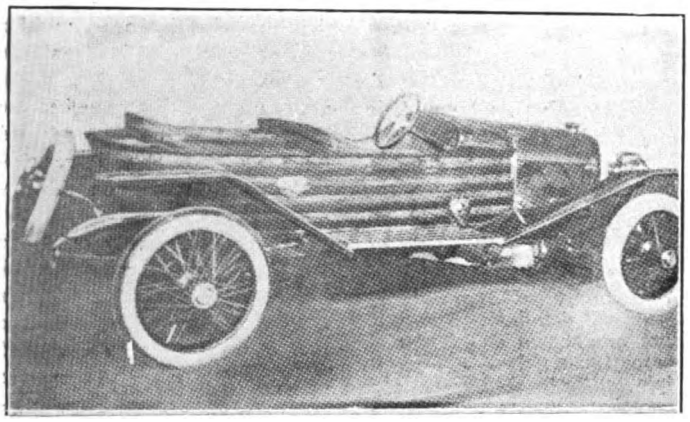
CAPITAL INCREASE

Premier Motor Mfg. Co., Indianapolis, Ind., increased capital from $200,000 to $700,000.

THE AUTOMOBILE SALON AT PARIS

Consul General Frank H. Mason, Paris, says the Fourteenth International Exhibition of Motor Vehicles and Cycles at the Grand Palais in Paris, was held early to precede the Olympia Exposition in London, and caught some of the French manufacturers before their models for 1914 were ready, so that several exhibited their models for the current year.

The exhibition differed from all its predecessors in being distinctly a business show, held not for displaying novelties or costly and luxurious triumphs of construction and decoration but of showing the public what each manufacturer had to sell at prices which people of all conditions in life, down to those of moderate means, can afford to buy. Everything about the exhibition was therefore severely plain and practical. The superb decorations of the ceiling and walls, the myriads of colored electric lights, the sumptuous equipments of the various stands, the luxurious limousines and elaborate touring cars, so profuse and bewildering in other years, were conspicuously absent.



Another "Boat" Design at the Paris Salon

The example of American exhibitors and the keen competition of the American-made automobile—which began in earnest a year ago—have had their effect upon European makers, who have now ceased their efforts to astonish and surpass their competitors and they are content to exhibit their newest and best in the class of moderately priced, practical machines, which their agents can sell in competition with the invading American car and for which plain, practical people can afford to pay.

There were few novelties of importance. More than three-fourths of all the cars exhibited were of the open-bodied types, nearly all approaching more or less closely the torpedo model, with its characteristic straight lines, painted in gray-olive or other neutral colors, upholstered and equipped so as to best resist wear and weather.

AUTOMOBILE BODY DESIGN

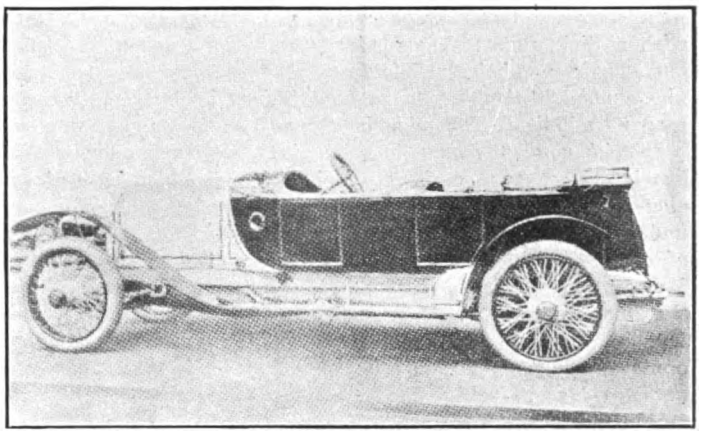
The uncommonly good opportunities afforded Cooper's (London) Vehicle Journal to visit, study and illustrate all that is new, leading or important in European practice in vehicle body design at the various English and Continental shows, has been, in a way, summed up as we quote:

Looking back over the year, which constitutes the 1913 season for the designer, it cannot be said that it has been productive of any radical departures. Makers, both of chassis and bodies, have been working at high pressure, and when this is the case—in whatever trade—great novelty in design can hardly be expected. Yet when trade is bad, and orders hard to obtain, changes may be made to give the salesman new "talking points," but novelties in design due to such circumstances are not generally likely to be of great value.

In bodywork, as in the chassis, we are reaching the point when further improvements may be looked for rather in the details than in any sweeping changes of type, and the progress of the past year has been decidedly in this direction. Types have not changed much to speak of, but "lines" have been much improved, producing a better balanced and more harmonious whole: and this improvement has also affected the various components used in body construction.

The dominant influence throughout has been "streamline effect," and the general rounding off and smoothing down, of all protuberant corners and excrescences. Perhaps this has been overdone, for after all the average touring car is not intended to be driven at such speeds that air resistance will exert any very great effect; but there has also been an all-round, and on the whole successful, endeavor to obtain better "balance" in general design. The various factors affecting this particular point, such as total height of body in relation to its total length, height of elbow line in a covered body, in relation to the height of head and vice versa, the overhang behind rear axle center, position and shape of doors, and the profile of bonnet, scuttle and elbow line—all these are all so intimately bound up with each other, that it is only by a gradual process of evolution that we at length arrive at a pleasing combination of the whole. In this respect we are passing through an educational period, in the process of which we have had to get rid of ideas preconceived from long acquaintance with horse-drawn vehicles. But when one looks at a modern high-class limousine it has to be admitted that we have emerged into a clearer atmosphere where the old influence is little felt.

The relative popularity of the different types is, of course, dependent on owners' circumstances, but, speaking broadly, there can be no doubt that for country work the touring phaeton is an easy first, while there is a good demand for two and three seaters, especially of the small powered, less expensive varities. But for purely town work it is not so easy to form an opinion. Here the covered car is almost a necessity, but whether it should be permanently enclosed, as a limousine, or of a design permitting of opening or partly opening at will—as in the cabriolet or landaulette—this must depend upon the individual requirements of the owner. From such inquiries as we have been able to make, however, it seems that what is known as the "all-weather" body is coming into an increased popularity. This is a type that may be classified with the cabriolet, though the term is usually meant to apply to a body lighter in construction of headwork, and without the heavy folding pillars characteristic of the cabriolet.



The New "Boat" Automobile Design

The "saloon" type, or totally enclosed car, has also met with growing favor.

In coupes some nice designs have been turned out, and for doctors' work or the like, it is a good, useful type; but its vogue is limited, especially in the limousine or permanently enclosed variety.

Dealing with those general features of design which affect practically all types, the gradual transition from the parallel line bonnet with square-fronted radiator to the tapered bonnet and rounded nose radiator has made considerable progress, and the day is probably not far distant when any awkward break between the body proper and the bonnet will be no longer tolerated. The narrower and higher radiator, rounded off towards the front and merging harmoniously into the nicely tapering bonnet, improves so greatly the aesthetic appearance of a car that already we are beginning to look upon the older type as out of date.

Wings and mudguards show hardly any change, although in isolated cases some care has been devoted to making them more efficient.

Running boards or side steps call for little remark. They continue, as heretofore, to fill in more or less completely the gap between the front and rear wings, and to be made in solid form, covering preferably with ribbed or chequered aluminum sheeting. The valance, or covering piece between the step and the body, is now usually of sheet metal, but on the Continent some makers have made it in one with the side panel of the body. Running boards made of open longitudinal wood slats with intervening spaces, have not proved popular.

In the overall lines of design for the various types of bodies the governing feature has been the increasing vogue of the flush side and streamline effect. The liberal use of exterior moldings for decorative effect has largely fallen into disuse.

In open types the tendency has been for sides to be rather deeper with seat backs only slightly higher. Rotund—or "bulbous"—backs, though not at all general, seem to have increased slightly in popularity, partly because they lend themselves to streamline form, and partly because the space inside can be utilized for stowing that bugbear of appearance—the spare wheel.

In so-called two-seaters—which are almost invariably fitted with a dickey seat that renders the term a misnomer—there has been a good deal of feeling the way to arrive at a really nice shape of fish tail, but the fact that we seldom see two alike seems to indicate that this is not easy. The dickey seat has been with us all the time, in spite of its very serious drawbacks, but lately we have designs which aim to include a third seat close up to the front seat, and so arranged that it will come under the hood. In one car the designer has made a sort of cockpit with vis-a-vis seats, thus converting a two into a four-seater. This is conceivably the first step in an evolution that may give us a car designed as a two-seater but to take four on emergency. Apart from conducing, as such a development would, to a very short wheelbase, it certainly would not prove a desirable influence in the evolution of the automobile.

In covered cars the striving after neatness of shape has resulted to some extent in a reversion to narrower rear seats—for two passengers instead of three—and this, we think, is to be commended. For the purposes for which these cars are often required any attempt to accommodate three on the back seat must inevitably lead to undue crushing of frills and furbelows. By reducing the width of the car, too, straighter lines are possible; thus drop lights are rendered feasible. Swept and domed roof construction increases in popularity, and a good deal of attention is being given to eliminate the "drumming" noise usually associated with this type of roof.

In describing the last Paris Show we referred to certain saloon bodies which had roofs of leather, permanently fixed and designed to this end; but as leather is subject to stretching and contraction under variations of weather, it is not a material that highly commends itself. The latest development in construction of limousine bodies, in which a skeleton framework is covered with thin sheet steel, pinned on and soldered in situ at the joints, permits of a packing of some insulating material between the shell and the interior lining, and this is found to act satisfactorily in stopping noise. The domed roof, except in a modified form, has not been adopted to any great extent, but it seems coming into extended popularity.

In limousine interiors there is an increasing demand for expensive inlaid wood panelling among the more luxurious and expensive cars.

In cabriolet and landaulette types of body there has been practically no change. Such improvements as have been made have been chiefly confined to the head fittings, the object aimed at being to make a construction which shall be simple in its parts, light to operate, and which may in the open position fold down compactly and neatly as nearly to the horizontal as possible, and overhang as little as may be.

The continued demand for large quarter lights makes the head problem one of no small difficulty. The method adopted by Continentals is to have in landaulette roofs a solid removable section, adapted to swing forward and rest upon the permanent roof just over the doors.

Yet, although the year has been a comparatively quiet one as regards novelties in design, there have been brains at work upon a problem of moment to the body builders. At Olympia Show there was a body which may be described as a sample of engineering work, since it was all built of metal and had practically no wood work about it at all. For the average moderately priced car, body making, except as regards trimming and painting, is likely to develop more or less into an engineers' job. And not only so, but a more recent departure in small car construction reveals the fact that the body has been so constructed as to eliminate the chassis frame. In this the body is of sheet metal built up on a very light angle-steel framing, so that, with the panelling, which is secured by flat-headed countersunk rivets, a channel of enormous depth is practically formed by the sides of the body, for the doors themselves are not carried down the full depth to the footboard. Taken all round the construction of these cars opens up a new field and new possibilities, the development of which will be watched with much inteest—the more so as the general principles it involves are those of which we are likely to see much in the future.

What we believe will prove to be a correct forecast of body design for the ensuing year may be put in a very few words—"refinement of last year's models and wider adoption of the all-flush side."

GOODRICH PRICE REDUCTION

The B. F. Goodrich Company announces a reduction in tire prices to the user. Last spring the Goodrich Company reduced prices to the consumer. W. O. Rutherford, of the general sales department, says: "At this time a lowering in the cost of tires means a lot to the user. The price reduction is considerable and every man who has to buy tires is going to appreciate it. A price reduction on Goodrich tires involves no sacrific of intrinsic value. The fact that the lower prices affect Goodrich safety tread tires shows that this is no half-way measure."

P. P. HUNTER AND HIS ENDLESS CHAIN

P. P. Hunter, of the American Carriage Co., of Cincinnati, has requested the Chamber of Commerce to take up the matter of advocating a National Clearance Day, on which every person owing small bills settle them, thereby starting an endless chain of settlements that will put thousands of dollars in circulation in every city, while at the same time it will work no hardship on any one. The matter has been taken under advisement.

JUST WHAT WE HAVE SAID RIGHT ALONG

The Rider and Driver, under the caption the "Three Graces," puts it in a parable this way:

The Manufacturer.

The Purchasing Agent.

The Engineer.

The Manufacturer to the Engineer: "We want a car or truck that will sell for such and such profits, to be so and so, etc."

The Engineer: "I will at once design what you request."

The Engineer to the Purchasing Agent: "Get prices and blue prints on a chassis, engine, steering wheel, axles, both front and rear tires, magneto, transmission, carburetor, steering outfit, etc., etc., etc."

Price Returned.

The Engineer, after a few weeks, has the honor to report to the Manufacturer that he is able, with **his ingenuity,** to build a car, truck or etc, for so and so.

But

The facts which are not one of the graces:

The manufacturer with his money,

The purchasing agent drawing a salary.

The Engineer—this is the point. He takes Jones' frame, Smith's engine, Brown's transmission, etc., uses a few bolts and out comes a car or truck with his, Mr. Who's Who's name, as engineer, who really is not capable of **making anything original.** The **real** engineers are the engine builder, frame builder, the chassis designer, the transmission builder, the axle builders, the ignition builders, the carburetor builders. But you never hear anything of them.

WRITE TO BUREAU COMMERCE AND LABOR

An American consul reports that a prominent carriage manufacturer in his district is most desirous of being put into communication with American houses, with a view to receiving prices, etc., for rims, hubs, spokes, springs, etc., for vehicles, such as carriages, express wagons, carts, and drays. He would also be glad to obtain information and quotations from exporters of ash, hickory, oak, whitewood, and other woods suitable for vehicle construction.

EVINRUDE MOTOR CO. REORGANIZED

The Evinrude Motor Co., of Milwaukee, has been reorganized and the capital increased to $350,000. The officers named under this reorganization are: President, C. J. Meyer; vice-president, Walter A. Zinn; secretary and treasurer, John F. Koch. The directors are: George W. O'Neil, Walter A. Zinn, George Brumder, Arthur Munkwitz, John F. Koch and C. J. Meyer.

ABOUT MEYER THREAD

The Meyer threads can be had in any color or size wanted in spool silks as well as ready-wound bobbins. The Meyer threads are strong in trade position everywhere such thread has a use. The largest builders are on the list. Test them by trying a free sample which will be sent from John C. Meyer & Co., Lowell, Mass.

FIRESTONE "EATS"

The restaurant installed in September by the Firestone Tire & Rubber Co. is one of the most popular departures in the interest of its employes, affording them a saving not only in the cost of food, but also in time. Here meals are served at cost—breakfast, dinner, supper and a meal at midnight—good food being provided; and on the opening day 300 men were served in 18 minutes. Previous to installing this restaurant the company investigated similar eating rooms maintained by factories in various industrial centers, and the good points of all are said to be combined in this lunch room.

EVEN AMESBURY HAS WAKED UP

Though the world wide depression in business cannot but be reflected to some extent on Carriage hill there is no stagnation as in many other places.

T. W. Lane, the old name and trade so long associated with Amesbury's activities, still keeps busy at the carriage making trade, and has orders enough to keep going for a long time.

The Clark Carriage Co. and Hollander & Morrill are busy turning out a large product.

NEW TIRE COMPANY IN BUFFALO, N. Y.

The Henderson Tire Co. filed incorporation papers in the county clerk's office. It is capitalized at $400,000 and will build a plant for the manufacture of automobile tires.

The directors are Chester O. Henderson, Ralph R. Hillman, Alfred L. Lyth, Seth S. Spencer, Jr., and Joseph H. Morey.

MANAGER EDGERTON WAGON CO. RESIGNS

George H. Needham, manager of the Edgerton (Wis.) Wagon Co., has resigned. Mr. Needham becomes assistant superintendent of the Emerson-Brantingham Co. plant at Batavia, Ill., manufacturers of wagons, etc. Mr. Huxtable will again assume entire management of the Edgerton factory.

FULL MOON

The Moon Bros. Carriage Co., of St. Louis, has applied for new incorporation papers. Its previous certificate has expired. The capital has been increased from $200,000 to $400,000. John C. Moon, C. R. Crawford, John W. Drew, F. William Ziegenhein and Henry R. Winefree are the incorporators.

DETROIT FACTORY FOR GRATON & KNIGHT

The Graton & Knight Mfg. Co., the old established leather goods house in Worcester, Mass., has established a branch factory in Detroit. It is in charge of C. F. Urquhart and is located in what was formerly the Wayne Belting Co.'s plant on Second avenue.

CHANCE OF A WAGON WORKS

At Texarkana, Tex., the Townsend-Thompson Lumber Co. are contemplating a manufacturing plant for the manufacture of wagons out of the hardwood which abounds in that section.

NEW APPOINTMENT

E. B. Jones has been made secretary and manager of Deere Implement & Vehicle Co., of Montgomery, Ala. Was formerly connected with Tullis Hardware Co.

WAGONS ON BARGAIN COUNTER

Hannibal (Mo.) Wagon Co. bought out entire stock of Fish Bros., sold by J. I. Case Mfg. Co., of Racine, and now there are wagons for sale at prices to attract.

GERBER BUYS ANOTHER

The Abbott Motor Co. has been added to E. F. Gerber's collection. This is the man who wanted the lock, stock and barrel of the Michigan Buggy Co.

OBITUARY

William H. Son, 50, vice-president and general manager of the Sheldon Axle Company, died November 30. He had been an invalid for a long time previous to his demise. He was taken ill following his return from Cuba in April, 1911, where he went seeking rest after a general breakdown due to his business activities. Upon his return home, he found it necessary to seek another climate, and spent a year at Loomis Sanatorium, Loomis, N. Y. He failed to gain the desired health and strength, however, and last May returned to his home, taking up his residence at Dallas, Pa., where he remained until his death.

Mr. Son was born at Ames, N. Y. On his mother's side he was of Scotch descent, while the forefathers of his father were Holland Dutch. The latter were prominent in the Revolutionary war.

Through thrift, honesty and ability, Mr. Son rose from the position of errand boy and shipping clerk in the factory of D. W. Shuler & Son, at Amsterdam, N. Y., to the high position of vice-president and general manager of the Sheldon Axle Co., one of the largest manufacturing concerns of its kind in the country.

He was a manager of fine executive abilities and had a fine hold on the regard of the men under his direction. Much of the latter day progress of the axle works is directly due to his skill and talent.

The father of Mr. Son died on November 4 last leaving a widow who now mourns the loss of both husband and son within a month's time. Besides his wife and mother, Mr. Son is survived by two brothers, John W., manager of the spring department of the Sheldon Axle Co., and Fred H., of Amsterdam, N. Y.; also one sister, Mrs. Maurice D. Moore, of Amsterdam, N. Y.

His mortal part was taken to the family home at Amsterdam, N. Y., and there laid to rest, the 1,800 employes of the company paying a last farewell by lining up, uncovered, as the body was passing the plant on the train bearing it away.

Godfrey Faethe, a well known carriage builder, for many years in business on North street, opposite the old Central Police Station, Baltimore Md., died December 3, at his home, 502 Harwood avenue, Govans, from the infirmities of age. He was born in Germany, came to this country when 21 years old and secured employment with the late Christopher H. Everding, a wagon builder, and father of H. B. L. Everding, of Govans. Later he went to Kingston, Somerset county, and on returning to Baltimore worked for a number of large firms and then started the business on North street. He retired three years ago. Mr. Faethe was 83 years old. He is survived by his widow and four daughters.

F. Goodwin-Evatt, sales manager of the F. A. Ames Buggy Co., died at the City Hospital, Owensboro, Ky., November 18, from the shock following an operation. Mr. Evatt moved to Owensboro six weeks previous from Flint, Mich., to take charge of this department. His body was taken to Flint, where he leaves a wife.

Frank A. Haas, a retired carriage manufacturer, died December 4, at his home, 871 Jefferson avenue, Brooklyn, N. Y., of a complication of diseases. Mr. Haas was 58 years old. He was born in Germany. His wife, three sons and two daughters survive.

John Kiser, 86, a retired carriage manufacturer of Lexington, Ky., died November 24, of apoplexy. Beside his wife, he is survived by three daughters and one son.

Jasper H. Randlett suddenly passed away at his home in Northwood, N. H., December 7. He was born in Lee, 1827. In the early fifties he went to California where he remained seven years. Upon his return to the east he engaged in business in Newmarket, N. H. In 1864 he established the well known carriage factory at 223 Central avenue, Dover, N. H., where he was in business nearly 40 years. He is survived by two daughters.

Robert M. Rocap, of the firm of Rocap & Son, Bridgeton, N. J., died November 28. He was nearly 80 years of age. He suffered from kidney trouble complicated with heart trouble. For many years the deceased had conducted a carriage manufactory and wheelwright shop on Franklin street, where he erected some years ago a substantial brick building. Beside his son, Robert L. Rocap, who has been associated with him in business, the deceased leaves a wife and two daughters.

Charles H. Stratton, who owned the Stratton Automobile Works in Muncie, Ind., in which was produced a high-wheel buggy, died suddenly in that city, November 28, from the effects of a stroke of paralysis. In addition to his high-wheel buggy, Stratton had invented several other automobile contrivances but, despite the fact, never figured prominently in the industry.

A. H. Wood, secretary of the Turnbull Wagon Co., Defiance, O., dropped dead in Chicago, December 10, where he was attending a meeting of the National Carriage and Wagon Manufacturers. He was accompanied by his son, W. W. Wood.

Fred W. Wood, New England manager for James Cunningham & Sons Co., was seized with heart failure in front of 200 Dartmouth street, Boston, December 11, and was pronounced dead at the City Hospital a few minutes later. He was born in New York in 1850, worked for some years in the carriage factory founded by his father, and then became manager for the firm of James Cunningham & Sons Co., of Rochester, N. Y. He is survived by a widow and one son. His home was at Brookline, a suburb of Boston.

DEATH OF E. TWELLS ASH

E. Twells Ash, a traveling representative of The Carriage Monthly between the years 1888 and 1893, and well known to all the older men in the carriage trade, passed away in Chicago, November 1. He was the son of the late Dr. H. St. Clair Ash, Philadelphia.

Mr. Ash served as advertising solicitor in the middle west and contributed frequently to the reading pages of the paper as well. After leaving the publishing business he entered the insurance field, with headquarters at Buffalo, and of late he had represented a large firm in Chicago.

ORGANIZE TO MAKE "ONE MAN" TOPS

The Golde-Patent Mfg. Co. has been incorporated under the laws of the state of New York with a capital of $200,000, for the purpose of manufacturing automobile accessories and supplies and principally the Golde Patent "One-Man" Top. The officers of the company are: President, Ernst Alfred Golde; vice-president, Richard Emil Golde; secretary, treasurer and general manager, Alfred Langer.

Trade News From Near and Far

BUSINESS CHANGES

J. Shonka has purchased the stock of vehicles, etc., in Dwight, Neb.

C. J. McCarthy has bought the Paola (Kas.) Implement & Vehicle Co.

V. Brandonberg has sold out his stock of vehicles in Deweese, Neb.

Melvin May has purchased the Roberts stock of vehicles in Beaver City, Neb.

A. J. Stump has succeeded to the business of Cook & Stump, in Van Meter, Ia.

E. F. Irwin has purchased the business of J. B. Allen & Son, in Quasqueton, Ia.

T. E. Boyd has been succeeded in business in Arispe, Ia., by Burr Forbes & Son.

Elmer Cornick has been succeeded in business in Oakville, Ia., by J. W. Everman.

J. D. Marton has purchased the David Young stock of vehicles, etc., in Cedar Bluffs, Neb.

G. M. Oldre has succeeded to the vehicle business of Oldre & Schmidt, in Garretson, S. D.

P. H. Rosebrook has purchased an interest in the Doty Motor Co., in David City, Neb.

Horgen Bros. have purchased the stock of vehicles, etc., of B. D. Sargent, in McIntyre, Ia.

Boylson & Muetzel have been succeeded in business in Greenville, Ia., by H. L. Collins.

Wm. Ferrell has purchased the stock of vehicles, etc., of J. B. McKeever, in Winterset, Ia.

R. G. Cole is closing out his stock of vehicles and will retire from business in Charlotte, Mich.

M. L. Gollahar has purchased the stock of buggies, etc., of A. A. Johnson, in Elmwood, Neb.

S. T. Marshall has disposed of his stock of buggies, etc., in Pipestone, Minn., to W. C. Schulz.

Dwight Poage has succeeded to the entire ownership of the DeSmet Auto Co., in DeSmet, S. D.

Stoffen & Wilson have purchased the stock of vehicles, etc., of W. C. Bennett, in Clayton, Mich.

S. J. Davidson has disposed of his stock of vehicles, etc., in Turton, S. D., to Wm. Bass & Son.

J. E. Clonch has purchased the stock of vehicles, etc., of Caset, Piercy & Smith, in West, Tex.

W. H. Meyer has disposed of his stock of vehicles in Fairview, Kas., to Robbins & Eisenminger.

M. D. Bunker has sold his hardware business in Conklin, Mich., but continues to handle vehicles.

J. E. Nelson has purchased the business of the Humboldt Auto & Supply Co., in Humboldt, S. D.

Doak & Hortsook have succeeded W. H. Doak in the vehicle and implement business in Winterset, Ia.

Siebles & Schoon have purchased the vehicle and implement business of Siebles & Heeren, in Monticello, Ia.

S. C. Manifold has been succeeded in the vehicle and implement business in Coin, Ia., by Butchel & Castillo.

Francis McAdam, of Syracuse, Kas., has purchased the stock of vehicles of Strain & Kaad, in Jamestown, Kas.

George Willing has disposed of his stock of vehicles and implements in Broken Bow, Neb., to James S. Kirk.

Thompson & Knox have succeeded to the vehicle and implement business of H. W. Knox, in New Bloomfield, Mo.

DeMots & Duistermass have purchased the business of W. H. Beacon, in Sheldon, Ia., and will take possession Jan. 3.

John Gorder has succeeded to the vehicle and implement business of his brother, August Gorder, in Plattsmouth, Neb.

C. C. McGregor & Sons have succeeded to the vehicle and harware business of Harvey, McGregor & Co., in Carsonville, Mich.

Hansen & Lyman have succeeded Plynn Lyman in the vehicle business, and a stock of automobiles will be added, in Greenville, Mich.

NEW FIRMS AND INCORPORATIONS

E. Loosbrock has engaged in the vehicle business in Loretto, Neb.

John Caughan has opened a new stock of vehicles, etc., in Earlton, Kas.

W. F. Dick is engaging in the vehicle and implement business in Montgomery, Ia.

Norval Williams is to open a new stock of vehicles in Hot Springs, Ark., January 1.

Johnson & Carlson have just engaged in the automobile business in Holdrege, Neb.

John Johnson & Son have engaged in the vehicle and implement business in Snover, Mich.

W. B. Thompson, of Oklahoma, is about to open a new stock of vehicles, etc., in La Plata, Mo.

Forest W. Terry and T. Lester Terry are engaging in the vehicle and implement business in Okmulgee, Okla.

J. O. Brown has formed a co-partnership with his brother, J. T. Brown, under the firm name of J. T. & J. O. Brown, at Wilmington, N. C., general carriage builders and repairers.

D. A. Graham and Murdick Graham, Gorham, N. H., have formed a partnership under the firm name of Graham Bros. for carrying on the business of auto, carriage and sign painting.

A certificate of incorporation has been filed with the secretary of state by the H. M. Kinsman Co., of Norwood, N. Y. It is proposed to do a general carriage and wagon business. The directors are Henry M. Kinsman, Henry L. Farmer and Edward E. Wright.

IMPROVEMENTS AND EXTENSIONS

S. C. Jensvold is erecting an addition to his vehicle building in Rake, Ia.

The Kranz Carriage Co., of St. Louis, Mo., has been granted a permit for a $1,500 addition.

J. M. Baldwin is moving his stock of vehicles, etc., to a better location in Humboldt, Kas.

Geo. Cattemole is about to erect a building to house his stock of vehicles, etc., in Storm Lake, Ia.

Fitzgibbon Bros. have let the contract for a large addition to their carriage factory in Monroe, Wis.

The Hercules Buggy Co., Evansville, Ind., has started work on an addition which will be used for the painting, smithing and trimming department.

Geoge M. Hain has broken ground at West Reading, Pa., for the erection of an annex to his carriage works. The annex will be a one-story brick building, having 36 feet frontage and 25 feet deep. When completed this will provide ample space for a storage room and a garage. Mr. Hain makes a specialty of repainting automobiles.

H. C. Hudson, of Newport News, Va., recently moved into a new building 50 x 100 feet and two stories high. The first floor is of concrete and the building has abundance of light

supplied by large fireproof window sashes. On the ground floor is the woodworking and blacksmith shops and on the second floor is located the paint, varnish and trimming and upholstering department.

Buckley Bros., carriage builders at Port Chester, N. Y., have just completed a new building to house their plant. On the ground floor there are, apart from the business offices, etc., two large floors which will be devoted to automobile and carriage repairing, and these will be thoroughly equipped for these purposes. Carriages will be transferred to the second story by means of a power driven elevator. The factory will be lighted throughout by electricity.

A new addition has just been completed for the Schweitzer Carriage Works at Martins Ferry, W. Va. The plant has over 15,000 feet of floor space on its two floors and loft. The first floor is devoted entirely to the workshop for repairs and emergency work, a complete set of new and up-to-date machines facilitating the labor. The second floor is where the real work of the master builder can be best appreciated as there the finishing touches to the rough and blocked out carriages and auto beds are placed. The drying room is situated in the rear where a special arrangement of the light can be made to suit the different conditions. The third floor is used for storage purposes and the special work. The electricity for the plant is generated by its own dynamo, the system being so arranged that all machines are run by electric power.

FIRES

The Montgomery (Ala.) Carriage Works sustained a $10,000 fire loss.

The stock of vehicles of W. C. Cooper, in Belton, Mo., has been destroyed by fire.

The Rhode Island Vehicle Co., plant, of Providence, R. I., was damaged by fire on November 27. The building was insured by the owner, but Mr. Avila carried no insurance upon the vehicle works. His loss was confined to the machinery and work in the rear of the shop, most of his tools and stock being in the front of the building and saved.

Thirty automobiles were destroyed by a fire which swept the plant of the F. W. Sandruck wagon and carriage factory at 913-915 North Howard street, Baltimore, Md., November 19. The factory, which was a four-story brick building, contained in addition to the automobiles a number of wagons, buggies and motorcycles, and a quantity of paints, lubricating oils and varnish. The loss is estimated at about $125,000, about half of which was covered by insurance.

NOTHING DOIN' FOR MRS. PETERS

Mrs. Carolina L. Peters, administratrix of the estate of George M. Peters, is estopped of her claim to a one-half interest in the sale price of the Columbus (O.) Buggy Co., amounting to $175,000, by a decision handed down in federal court. Barring an appeal to the United States Circuit Court this will mean an immediate distribution of the sale money.

Mrs. Peters filed an intervening petition in the suit under which the carriage company was sold at auction. She set up the same claim which once had been established in the common pleas court, but which has been remanded for error and is still on the calendar there. The claim is that when Mr. Peters deeded the property to C. D. Firestone about 20 years ago it was not an outright deed, but a deed in trust. At that time the Columbus Buggy Co. was in financial straits.

ALL ABOUT GOOD ROADS SOUTH

B. M. Blount, White Hickory Wagon Co. and Blount Buggy Co., has been interviewed.

"We wagon manufacturers lose nothing by improvement of the roads. We are in fact, earnest advocates of good roads development.

"Improving the roads does not tend to decrease activity in our business, though a wagon traveling good roads will last longer than on rough roads, the increased general prosperity brought by better roads helps the wagon industry. With good roads throughout Georgia we would sell more wagons because there would be more farmers and more prosperous farmers."

With the improving of roads there is a change in the style of wheels on farm wagons, the demand tending more toward lower wheels with wider tires. The White Hickory concern is now selling thousands of wagons with wheels having tires two to four inches wide; fifteen years ago there was practically no demand for these.

HORSE-DRAWN VEHICLES AT PANAMA-PACIFIC EXPOSITION

Captain Baker, director of the Division of Exhibits of the Panama International Exposition, is confident of the future of the horse-drawn vehicle, and promises that the exhibits of such will be the most extensive and inclusive the world has seen.

In the Department of Transportation all of the products of the carriage maker's craft will be revealed, from sleighs to sedan chairs, pleasure carriages to hearses, and from carriages for infants to conveyances for invalids.

The result of human inventiveness for the farmer will be disclosed in the Palace of Agriculture, wherein will be shown farm wagons and farm carts, etc

LONG ISLAND CITY PLANT READY

Announcement was made of the completion of the first of four mammoth units that are to be added to the plant of the General Vehicle Co., on Borden avenue, Long Island City, N. Y. It is to be occupied by the company, and before the first of the year nearly 500 additional employes will be put to work.

The unit completed is five stories high, of brick and concrete, 100 x 500 feet, and is one of the largest manufacturing units in Queens.

The erection of the other three units, the total cost of which will be over $2,000,000, will shortly be begun.

R-C-H GOES TO H. BROS.

These initial concerns are following in the wake of the named concerns in trouble. The R-C-H Automobile Co. has been disposed of by Referee in Bankruptcy Lee E. Joslyn to Harris Bros., of Chicago, for a guarantee of $240,000 for the entire plant and real estate and also a guarantee to pay liabilities amounting to $28,000, thereby bringing the sale price up to $286,000. Harris Bros. will resell it, either collectively or in the courts and after deducting 15 per cent. from the actual amount of the price they paid for it, will turn the surplus over to the receivers of the concern to go to the estate.

MAKE AUTO PARCEL POST CAR

The Grand Rapids (Mich.) Motor Truck Co., which will likely undergo a reorganization, has developed a motor truck for the delivery of parcels. The car is 15 horsepower and has a carrying capacity of about 500 pounds in parcels and packages. In construction it is underhung with the package box in front of the driver. It is called a parcel post car and will be offered for the government postal service or for general merchandise deliveries. The car can be manufactured to sell at a price within the reach of the small merchant or the rural mail carrier.

LAUREN MELVIN FITCH

We published a brief notice of the death of Mr. Fitch, but there was no time to await a photograph or particulars. The many friends of deceased will like to have these further notes.

Lauren Melvin Fitch died at his home in Rome, N. Y., after a year's illness. He spent most of the past summer at the Thousand Islands in the hope that the climate there would bring back his shattered health, but when he returned to his home it was to go to his bed with a fatal illness, which gradually sapped his remaining strength.

Mr. Fitch was born in Brookfield, N. Y., September 3, 1849, and was therefore 64 years old. He was the son of Julius O. and Harriet (Lyne) Fitch. The father for more than 40 years was a prominent manufacturer of Brookfield and very successfully engaged in making and selling carriages and wagons. After being educated in the public school in that place the son, being of a mechanical turn of mind, entered his father's shop and learned the trade of wagon making, soon becoming a very proficient workman.

In 1875 Mr. Fitch went to Rome to make gears upon the invitation of R. M. Bingham & Co., in that way saving the freight on that product from Brookfield. He continued with the Bingham Company six years and then, desiring to engage in business for himself, he organized the Rome Spring Wagon Works, of which he remained at the head for a short time, then selling his holdings in that company.

In 1881 he began the business to which he devoted the remainder of his life, the Fitch Gear Works.

Mr. Fitch was three times married. He was first married in 1868, at the age of 19, his wife dying one month later. In 1870 he was married to Miss Frances Moore, who died in 1886, leaving a daughter, Blanch N., now Mrs. Frank W. Hixon, of Columbia, S. D. On May 23, 1895, Mr. Fitch married Miss Christine Stark, of Fort Wayne, Ind., who survives.

Mr. Fitch's very active life was devoted to business. He was deeply interested in fraternal matters and was a member of many organizations.

Besides his wife, there survive one daughter and two grandchildren; also three brothers.

TWENTY PER CENT. ON CONTINENTAL

Attorney Robert P. Hargitt announced that creditors of the Continental Carriage Co., for which a receiver was appointed almost a year ago, will receive a first dividend of 20 per cent. A. H. Miller, who was president of the company, was appointed receiver in December, 1912. A few days ago Judge Warner received Miller's resignation, saying he had accepted a position in Chicago and did not desire to act longer. The resignation and the appointment of Mr. Hargitt as receiver to succeed Miller was put on record.

"You can say that the creditors of this concern probably will get the largest dividend, when all are paid, than from any carriage company in this city which has failed," said Mr. Hargitt.

The assets of the company, excepting bills receivable, have been sold under order of court and brought about $20,000. There remains about $17,000 in accounts receivable and cash on hand. The liabilities amount to about $40,000.

WANTS

Help and situation wanted advertisements, 1 cent a word; all other advertisements in this department, 5 cents a word; initials and figures count as words. Minimum price, 30 cents for each advertisement.

PATENTS

Patents—H. W. T. Jenner, patent attorney and mechanical expert, 606 F St., Washington, D. C. Established 1883. I make a free examination and report if a patent can be had and exactly what it will cost. Send for circular.

HELP WANTED

Wanted—Two experienced body makers for heavy work. Only first class, steady, experienced men need apply. Riddle Coach & Hearse Co., Ravenna, Ohio.

Wanted—Body makers, blacksmiths, trimmers, painters and assemblers. Apply York Carriage Co., York, Pa.

SITUATIONS WANTED

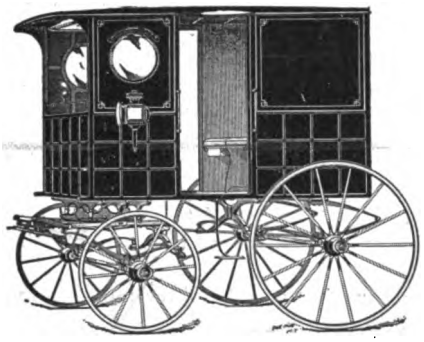
A practical, competent top factory superintendent, with wide experience and best credentials, desires a similar position; any locality. Address Box 40, care The Hub, 24 Murray St., New York City.

Wanted—Position as superintendent in carriage factory, by capable man with several years' experience as foreman and superintendent. Best credentials. Address Box 18, care The Hub, 24 Murray St., New York City.

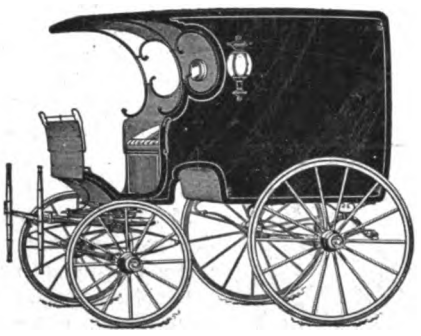
Position wanted as trimmer foreman, with good automobile or carriage company. Thoroughly experienced man. Good references. Address Box 20, care The Hub, 24 Murray St., New York City.

Blacksmith foreman, several years' experience. Buggies, wagons for the trade. Reference. Box 256, Milford, O.

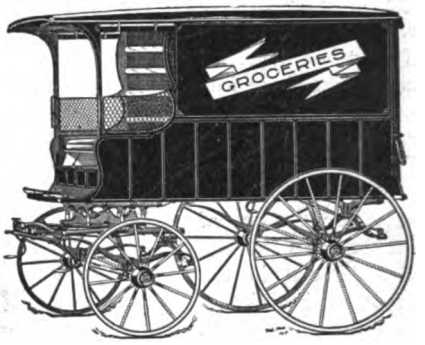
INDEX TO ADVERTISERS



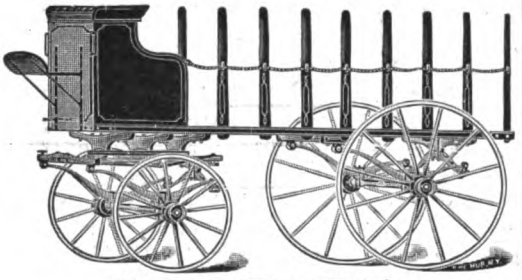
No. 112.—Milk Wagon.



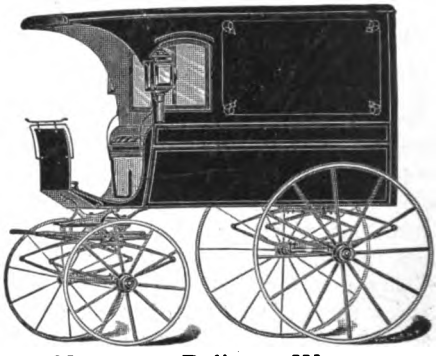
No. 111.—Altman Wagon.



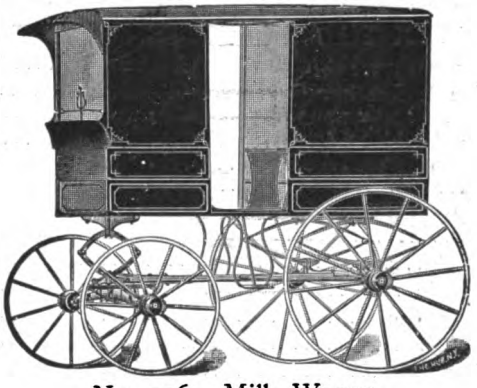
No. 113.—Grocery Wagon.



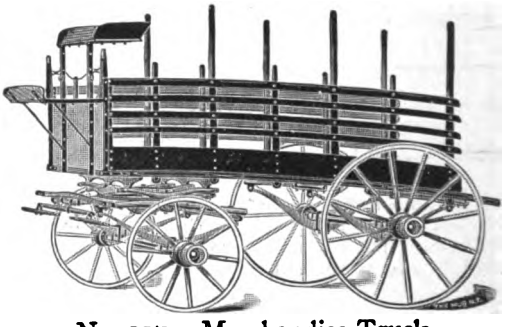
No. 122.—Flour Truck.



No. 115.—Delivery Wagon.

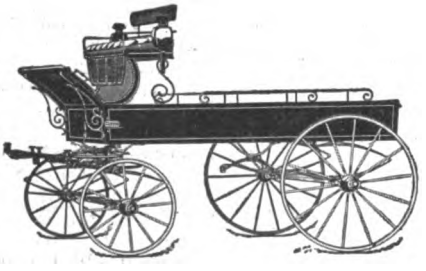


No. 116.—Milk Wagon.

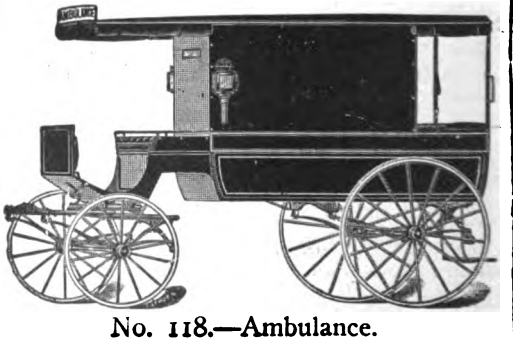


No. 117.—Merchandise Truck.

No. 114.—Delivery Wagon.



No. 124.—Delivery Wagon.

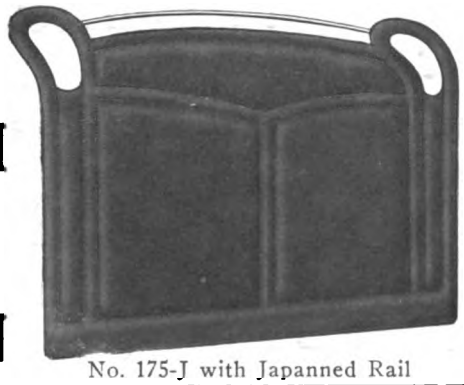


No. 118.—Ambulance.

BUSY BUYERS BRIEFS

McKINNON DASH COMPANY

Try Our No. 175 J. DASH For Your 1914 ROAD WAGON



No. 175-J with Japanned Rail

BUFFALO, N. Y.

TROY, OHIO — ST. CATHARINES, ONTARIO
CINCINNATI, OHIO

Remember to Call for

JAPANNED RAIL PADDED DASHES

For All Vehicles

"BLACK VELVET" CUSHION SPRINGS

Manufactured Only by the

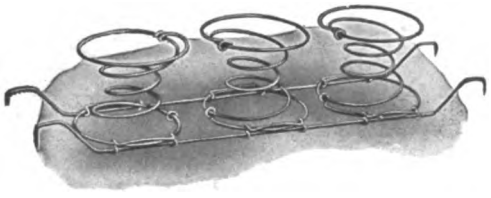
NATIONAL SPRING AND WIRE COMPANY

ALBION, MICH. WINDSOR, ONT.

THE SPRING OF QUALITY.

SPRING or SOFT EDGE CUSHION FRAME

For Buggies or Other Vehicles. Built of the Highest Grade of Steel Wire.



STRIP FOR WOOD OR BOX FRAME

WILLEY'S COLORS

The RECOGNIZED STANDARD

C. A. WILLEY CO.

COLOR GRINDERS

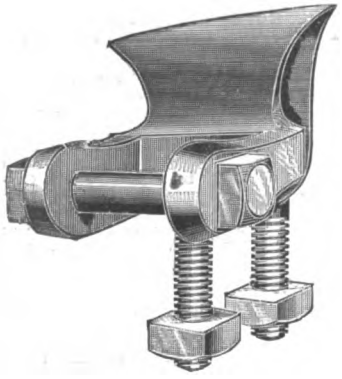
and Manufacturers of Specialties in

CARRIAGE, AUTOMOBILE AND CAR

PAINTS

COLORS, VARNISHES, ETC.

HUNTER'S POINT, NEW YORK CITY



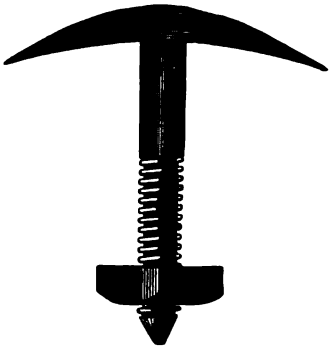
Skewed Shaft Couplings

Regular or Oval Patterns
For High Arched Axles

Furnished in rights and lefts for any height of arch. Oval Axle Clips 5/8 or 3/4 width to match Oval Couplings. Bolts, Clips, Couplings, Carriage Hardware and Special Forgings

Catalogue "H" and Prices on Application

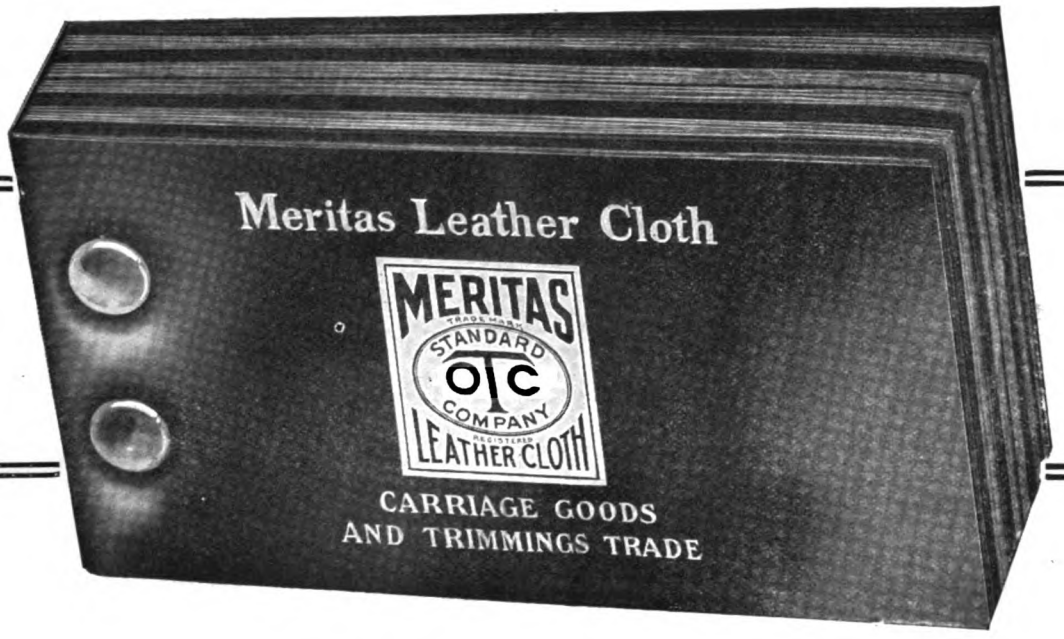
COLUMBUS BOLT WORKS, Columbus, O.



The Hub

TRADE NEWS PUBLISHING COMPANY
24-26 MURRAY ST. NEW YORK

Get This Sample Book



MERITAS LEATHER CLOTH

The Leading Leather Substitute

Every carriage builder, every auto manufacturer, every firm making tops, slip covers, lamp covers, storm aprons, buggy boots, tire cases and auto trunks should know about MERITAS Leather Cloth.

It's the most durable leather substitute made—unequaled in finish—guaranteed perfect.

Made in muslin, duck and drills, in patent leather and imitation rubber finishes, smooth or grained in black and colors.

Get the sample book—it shows all the styles in MERITAS Leather Cloth. Send for it NOW.

STANDARD OIL CLOTH COMPANY

320 BROADWAY, NEW YORK

The Hub

Entered in the New York Post Office as Second-class Matter

Vol. LV JANUARY, 1914 No. 10

THE TRADE NEWS PUBLISHING CO. OF N. Y.
Publishers of THE HUB

J. H. Wright, *President.* G. A. Tanner, *Secretary and Treasurer.*
24-26 MURRAY STREET, NEW YORK.

Other Publications of Trade News Publishing Co.:
HARNESS (monthly).....per year, $1.00
AMERICAN HARNESS AND SADDLERY DIRECTORY (annual).....per copy, $4.00

The Hub is published monthly in the interest of employers and workmen connected with the manufacture of Carriages, Wagons, Sleighs, Automobiles and the Accessory trades, and also in the interest of Dealers.

Subscription price for the United States, Mexico, Cuba, Porto Rico, Guam, the Philippines, and the Hawaiian Islands, $2.00, Canada, $2.50, *payable strictly in advance.* Single copies, 25 cents. Remittances at risk of subscriber, unless by registered letter, or by draft, check, express or post-office order, payable to the order of Trade News Publishing Co.

For advertising rates, apply to the Publishers. Advertisements must be acceptable in every respect. Copy for new advertisements must be received by the 25th of the preceding month, and requests to alter or discontinue advertisements must be received before the 12th day of the preceding month to insure attention in the following number. All communications must be accompanied by the full name and address of writer.

FOREIGN REPRESENTATIVES:

France.—L. Dupont, publisher of *Le Guide des Carrossier,* 78 Rue Boissiere, Paris. Subscription price, 15 francs, postpaid.
Germany.—Gustave Miesen, Bohn a Rh. Subscription price, 12 marks, postpaid.
England.—Thomas Mattison, "Floriana," Hillside Avenue, Bitterne Park, Southampton. Subscription price, 12 shillings, postpaid.

Entered in the New York Post Office as Second-class Matter.

Vehicles in January

The winter preparations for spring trade make an interesting season.

Perhaps it is too early for the horse-drawn vehicle men to trot out their new styles, but the gas-pushed vehicle men are holding their customary winter receptions in New York and Chicago, and the offerings have been very interesting.

The power vehicle is still in the developing stage, hence it is full of interest. The draft vehicle has passed through its states of standardization and is in the completed product era. The only place novelty is to be sought is in the modification of some detail that does not affect the type. It is necessarily not as interesting as a novelty, but such a stage of evolution is most comfortable for the builders of such work. He knows where he is "at" on costs, and can tell about where he may come out as to profits.

* * *

The machine vehicle is having its first salutary setback. The "struck oil" period has certainly passed. The makers can no longer disregard the expense. A leading light has expressed it in the following words:

"The automobile industry is in a state of change, a change from an artificial way of business to a substantial basis. Freak business methods and freak engneering must disappear."

This is a plain fact. The substantial methods are already to be seen. The automobile is fast approaching the stage when it will give as much value for the dollar as the buggy now does.

* * *

F. M. Galbreath, vice-president of the Anchor Buggy Company, says: "The period of doubt and uncertainty which we have passed through, during which a great battle has been waged between the horse-drawn vehicle and the automobile, has passed. We have in the past been taken to task for our conservative attitude, and automobile centers were pointed out as models of progress. Today some of those so-called models of progress are playing to an empty house and Cincinnati is ready to ring up the curtain on one of the brightest chapters of her vehicle industry."

* * *

This is very fine. The news that there has been a battle between the buggy and the automobile is known for the first time. Perhaps the reporter put down words the gentleman interviewed never uttered. It is true the buggy makers laid down and let the automobile roll all over them, but that is not a battle, that is an excursion over a corduroy road made of the spineless spines of the buggy builders who thought they saw the end.

* * *

"The so-called models of progress" are by no means playing to empty seats, as the gentleman interviewed exclaims. The interest shown at recent exhibitions would disabuse the unprejudiced of such a thought. When the buggy maker can charge a moderate admission to step in and see his new styles at state fairs, and have the public show a desire to see what is new in buggydom, he will not have the sensation that interest is declining. Neither has the motor car maker.

* * *

The buggy and the horse are still pristine, so it is not necessary to use any props to make the industry stand alone on its feet. There are really fine times ahead for the splendid light and strong horse vehicle, that can go where the auto car has difficulty in going, and that does the work demanded of it at so little expense for

upkeep. But it will never edge the engined vehicle off the roads and it is not desirable for the comfort of humanity that it should do so. As our domain consists of more than a billion acres of tillable land, and much of it is yet to be exploited or re-exploited, as the circumstances may direct, the buggy must be produced in million quantities for a long time to come, so it is not necessary to look upon the automobile and all its works as a competitor.

* * *

If it can be supported by the figures, it opens up an interesting vista to buggy builders when they are told by one of them that the field has not been as yet developed by more than ten per cent. When intensive cultivation of the field gets fully in hand, there will be such an outpouring of vehicles that even at the moderate prices asked there will be billionaires in the business who can make wage distributions similar to one Mr. Ford, and by the amount of free advertising that will be called into action to herald such munificence, promote the good of the industry beyond any present dreams.

* * *

Meantime we note in the automobile shows a tendency to cheapen production and lower selling price that is fast setting the stage for the entry of the cheap motor car.

By cheap motor car, the cheaper motor car is not meant, but rather the actually low-priced product.

Several examples of that description are now in the public eye, the price appears to be based on the Ford $500 as the maximum, and the effort is to make something good enough to sell below the Ford figure.

To an observer with the buggy perspective, some of the cars look like very models of the crude attempts that heralded in the "cheap" buggy, and unless progress in this development is as wonderful as has been characteristic of the trade generally, it will be a long time before a really worthy and popular car at an outstanding low price will make its appearance.

One or two now seeking favor are weird, and the price is no cloak for the defects in form and workmanship.

* * *

The medium priced motor car is at the present time in the spot light. Now that fundamentals of engine and other power factors have fallen into a kind of standardized state of practice, the ingenuity of designers has attacked form and price with the most flattering results.

From eight hundred up to twelve hundred dollars, the makers have paled previous efforts, and the buying public is getting the same kind of excess value as it is getting in the good wholesale buggy. This evolution will continue until something surprisingly good for the money asked will be the final outcome.

395,050

The stated number of automobiles are to be built in Detroit in 1914 according to the press agent of the industry. It would not be impressive except by contrast, so the number "done" in 1913 is put at 281,700.

We supposed merely the latter number was Ford's output for one week, until we read further along.

Wood Using Industries of New York

We have made use on another page of a generous excerpt from a pamphet of the above title issued by the New York State College of Forestry in co-operation with Forest Service, U. S. Dept. of Agriculture.

The Syracuse University issues the publication. Like all compilations of those who have to do with forestry it has great interest for vehicle people.

"HER" ADVANTAGES—A MONOLOGUE

That funny clever, or clever funny man, Hy Gage, in Cyclecar Age, has a skit in which a friend comes to give him a ride on a telegram invitation. Mr. Gage has not seen the proposed means of consuming space before the friend bursts in on him like star-dust, and here is the talk. It is clever, funny, and worth reading:

"Hy, she's a dream of delight!" he exploded when he burst into my bin that afternoon without warning. "She's the picture of grace! She's perfection personified! Such exquisite lines! Such curves!"

"Oh, that's the idea, eh? You're married at last? Introduce me."

"She's the smoothest piece of work that ever purred up the boulevard! And fast? Oh, mamma!" he went on, ignoring my interruption.

"Fast?" I blurted. "Steady, Tad, your enthusiasm is obfuscating your diction, as it were!"

"She can show a clean pair of heels to anything of twice her weight that tries to overtake her! And best of all, she's cheap! Anyone can afford to own her! Would you believe it, Hy, I've had people run after us on the street and ask to look her over! That's the kind of a lollipop she is!"

"What-at tha—? Say!"

"And what's more, she costs so little to run! Just keep her tanked up and she doesn't care what happens. Why I've run her for a week on an average of seventy-five cents a day! Can you beat that?"

"Good lord! Where is she now?"

"Why I left her standing down in the street."

"Huh? Standing in the street? And is she—er—tanked up now?"

"To the muzzle! Just gave her an extra gallon on the way over. Come down and give her the once over. I know you'll say she's a bird!"

"She must be!" was all I could gasp in my amazement as we descended to the street.

"Well, what d'yuh think of her? Some poor little car, I guess, eh?"

"Car?"

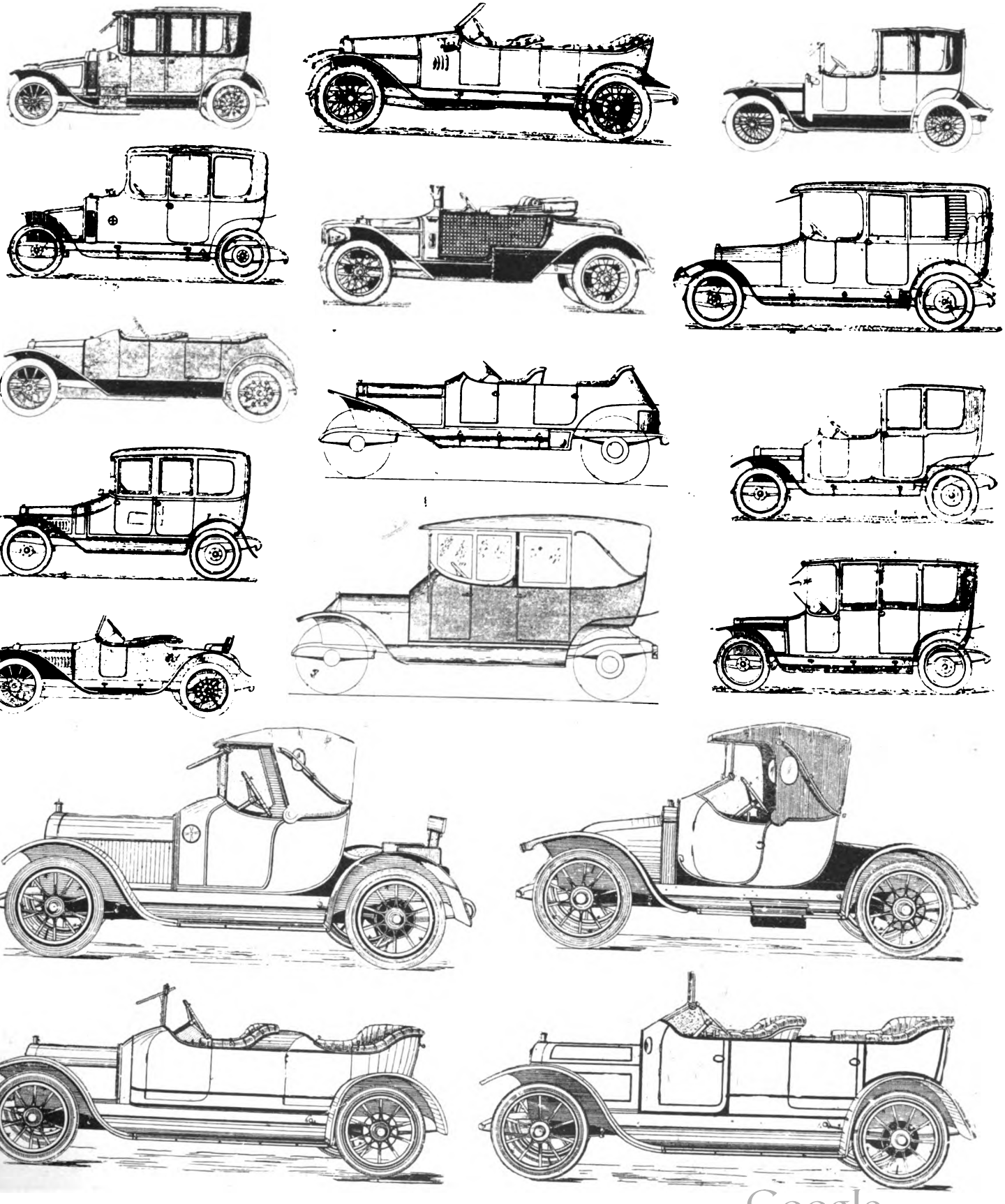
"Ye-ah! My new cyclecar."

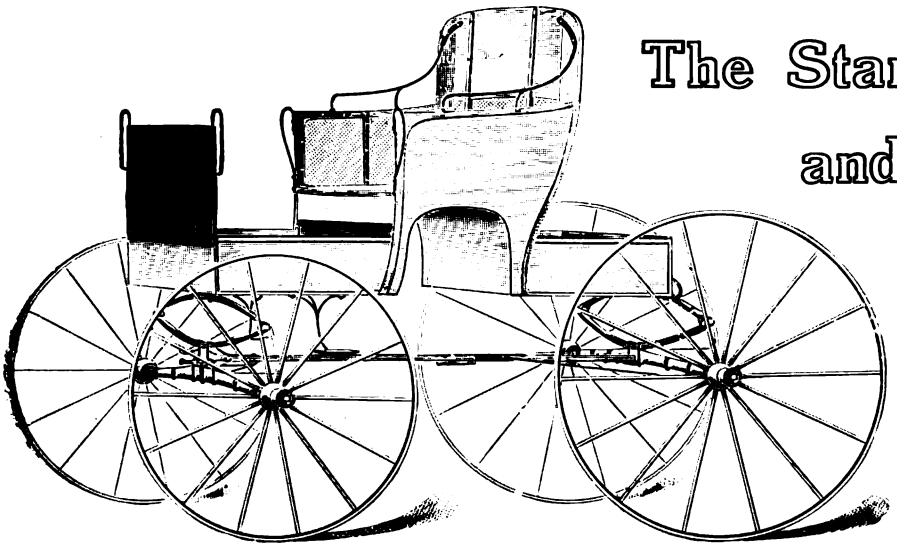
"Cyclecar? Oh-h-h-h!" and the light of intelligence dawned in my mind at last.

AN INTERESTING FACT

There are somewhat more than 500 recognized tree species in the United States, of which about 100 are commercially important for timber. Of the 500 recognized species, 300 are represented in the government's newly acquired Apalachian forests. All American species, except a very few subtropical ones on the Florida keys and in extreme southern Texas, are to be found in one or another of the national forests.

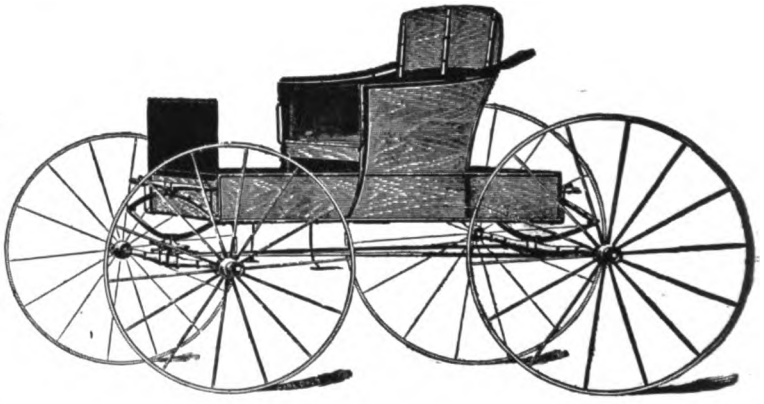
Latest Developments in Foreign Automobile Styles

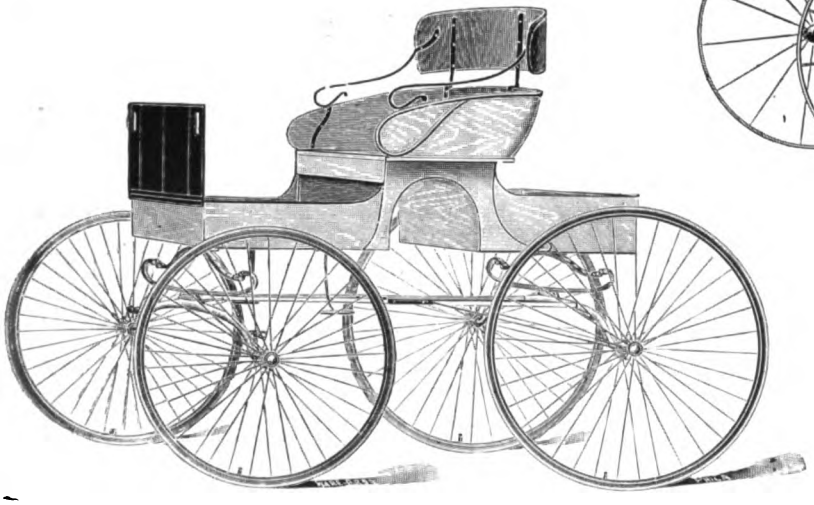


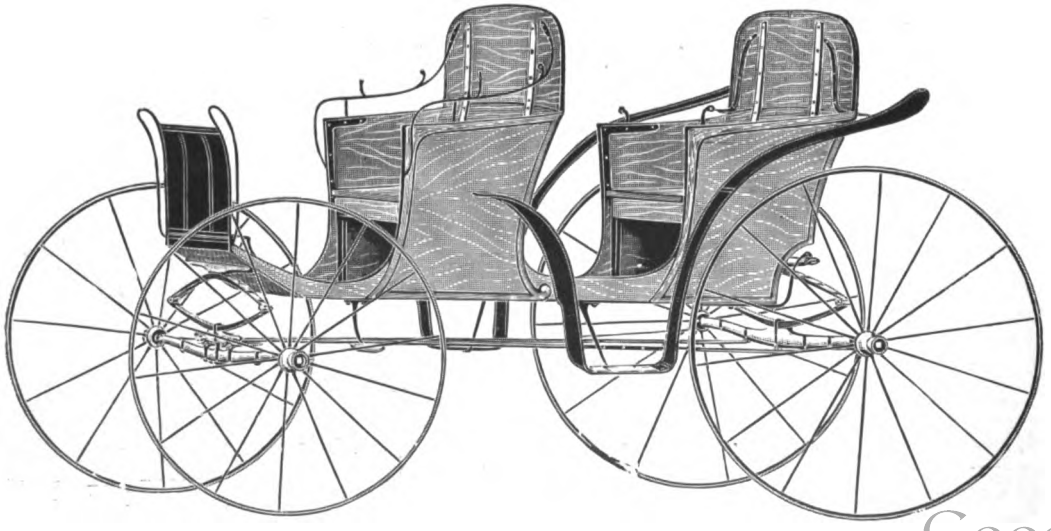


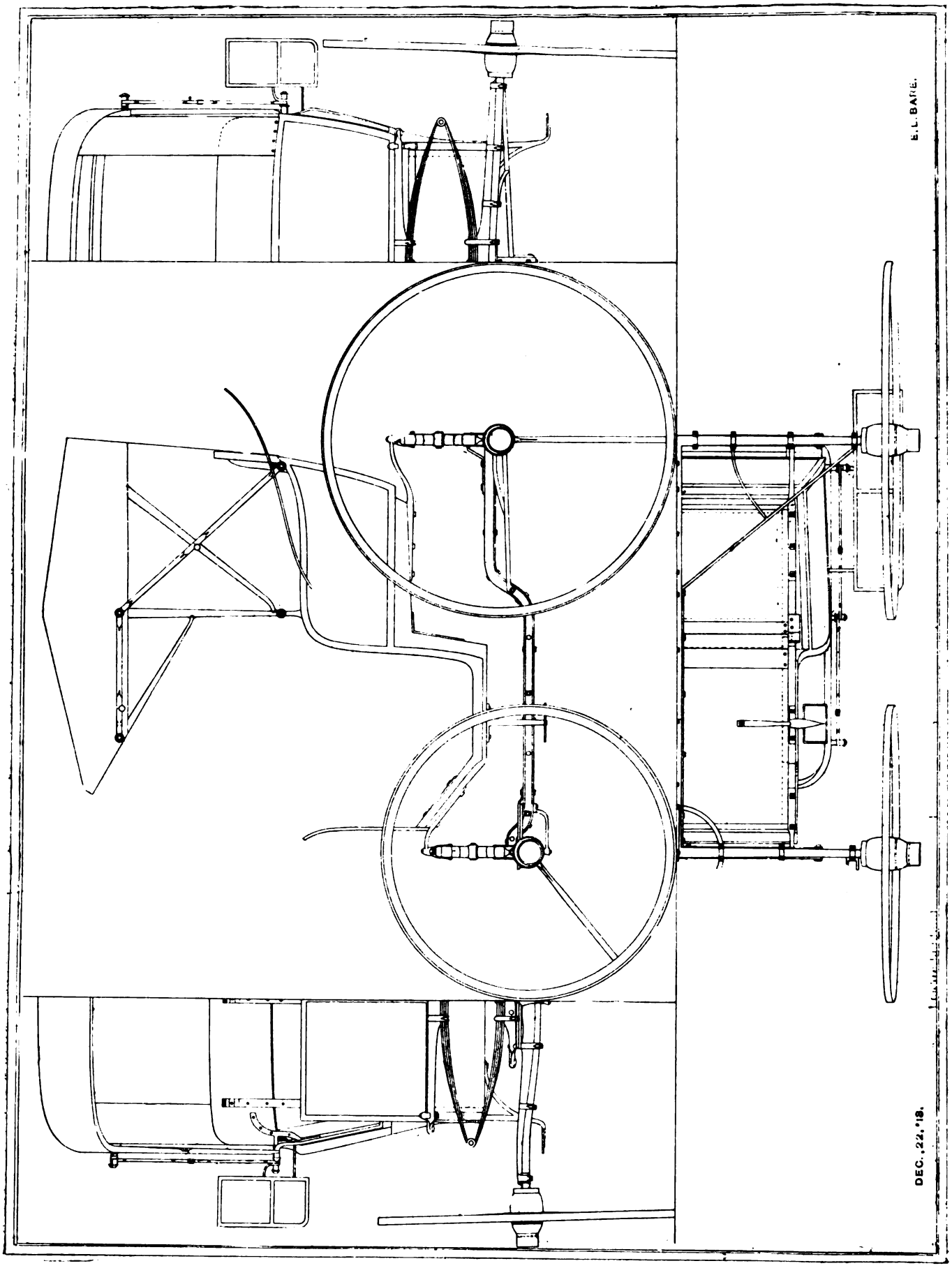
The Stanhope Vehicle and Its Modifications

A Study in Style









WORKING DRAFT OF TWO-PASSENGER PHAETON

(With Auto Top, Elliptic Spring Suspension)

Draft and description by Erwin Bare, of the Technical School for Carriage Draftsmen and Mechanics, under auspices C. B. N. A.

(See Illustration)

The dimensions for length and width are medium size. The style of this construction differs somewhat from those that have been made heretofore. The length from dash to front of seat is 22 in., the seat frame 20⅝ in., and amount of rear flare 4 in.

Distance from under surface of bracket to under surface of seat, 11¾ in.; depth of side quarter, 15 in.; depth of back from under surface of side quarter to top, 23¼ in.

Widths across body and seat: (1) Across rockers, 31 in.; (2) across molding on dash, 31 in.; (3) across under surface of side quarters, 33½.; (4) across top, 39¼ in.

In the construction of body the rockers consist of four pieces for each side, which are framed with tenons. The molding on outside of rocker is glued on in two separate pieces, one piece on the bracket and the other being a small pillar put in under the seat frame to flush even with the side quarter.

All cross framing is shown on drawing except the seat bar, which is let into the front edge of the rocker.

In the construction of seat the seat panels are one inch thick when dressed, and are joined at the corner by the back panel, being let into a rabbet in the end of the side panel; after being braced both ways the corner is covered by molding as shown in the drawing.

The panels are screwed to the outside edge of the seat frame, and on the inside of the corner there is a piece set in as is also shown on front view.

The bottom edge of the lazy back having a rabbet is set on top of the seat panel and is supported by three brackets as shown.

Dimensions of Wheels—Diameter of hubs and length, 4 x 6; diameter of hub bands, front and back, 2⅞ x 3¼ in.; thickness and width of spokes, ¾ x 1⅛ in.; thickness and depth of rims, 1 x 1 3/16 in.; amount of stagger of spokes, 7/16 in.; tread, 4 ft. 6 in.

One Front Elliptic Spring—Length from center of heads, 36 in.; open out to out, 8¼ in.; width of plates, 1⅜ in.; number of plates, 4; thickness of main plate, No. 2; thickness of other plates, No. 2.3.3. Clipped top and bottom.

One Rear Elliptic Spring—Length from center of heads, 36 in.; open out to out, 9¼ in.; width of plates, 1⅜ in.; number of plates, 4; thickness of main plate, No. 1; thickness of other plates, No. 1.2.2. Clipped top and bottom.

Axles—Front and back, half patent fantail style; size of square ends, 1 in.; size at center, ¾ x 1 5/16 in.; width of track, front and back, 4 ft. 6 in.

Widths of Body—Across rocker, 31 in.; across molding at dash, 31 in.

Widths of Seat—Across bottom, 33½ in.; across top, 39¼ in.

THE NEW C. B. N. A. COMMITTEES FOR 1914

Publicity Committee—W. H. McCurdy, president, Hercules Buggy Co., Evansville, Ind.; H. F. Cartwright, vice-president, Banner Buggy Co., St. Louis, Mo.; C. C. Hull, president, Rex Buggy Co., Connersville, Ind.; A. M. Parry, Parry Mfg. Co., Indianapolis, Ind.; C. W. Shipley, The Sechler Co., Cincinnati, Ohio.

Board of Trustees of Technical School—Charles J. Richter, chairman, 119 West 73d street, New York City; Daniel T. Wilson, New York City; Wm. R. Innis, South Bend, Ind.; Hon. Franklin Murphy, Newark, N. J.; Wm. W. Ogden, Newark, N.J.

Honorary—Charles Clifton, The Pierce-Arrow Motor Car Co., Buffalo, N. Y.; Herbert E. Rice, The Waverly Co., Indianapolis, Ind.

Committee on Freight and Classification—Theo. Luth, chairman, Luth Carriage Co., Cincinnati, O.; H. F. Cartwright, The Banner Buggy Co., St. Louis, Mo.; John D. Craft, Hercules Buggy Co., Evansville, Ind.; J. D. Dort, Durant-Dort Carriage Co., Flint, Mich.; A. M. Parry, Parry Mfg. Co., Indianapolis, Ind.; E. M. Galbraith, The Anchor Buggy Co., Cincinnati, O.

Advisory Committee—E. C. Meyer, traffic manager The Banner Buggy Co., St. Louis, Mo.; E. G. Payton, traffic manager Hercules Buggy Co., Evansville, Ind.; J. S. Tennant, traffic manager Durant-Dort Carriage Co., Flint, Mich.; C. T. Platte, traffic manager Parry Mfg. Co., Indianapolis, Ind.

Press Committee—G. A. Tanner, chairman, New York City; W. W. Wood, Philadelphia, Pa.; J. Frank Hutcheson, Cincinnati, O.; A. M. Ware, Philadelphia, Pa.; M. T. Richardson, New York City; C. C. Conant, Troy, N. Y.

Statistics—O. B. Bannister, chairman, Muncie, Ind.; C. S. Walker, Des Moines, Ia.; H. B. Staver, Chicago, Ill.; E. J. Hess, Carthage, O.; C. O. Summers, Barnesville, Ga.; J. D. Craft, Evansville, Ind.; J. D. Cathey, St. Louis, Mo.

Committee on Abuses in the Carriage and Accessory Trades—Perrin P. Hunter, chairman, Cincinnati, O.; Frank H. Delker, Henderson, Ky.; E. M. Galbraith, Cincinnati, O.; A. T. Jackson, Rockford, Ill.; H. A. Crawford, Kalamazoo, Mich.; A. M. Parry, Indianapolis, Ind.

Committee on New Members, Central Division—W. H. McCurdy, chairman, Evansville, Ind.; C. S. Walker, Des Moines, Ia.; F. A. Hastings, Chicago, Ill.; A. T. Jackson, Rockford, Ill.; L. E. Nutt, Moline, Ill.; O. B. Bannister, Muncie, Ind.; John D. Craft, Evansville, Ind.; George B. Heylmann, Noblesville, Ind.; A. M. Parry, Indianapolis, Ind.; Curtis Withrow, Connersville, Ind.; Carl D. Fischer, Terre Haute, Ind.; Robert C. Schemmel, Union City, Ind.; E. T. Yarnelle, Ft. Wayne, Ind.; H. A. Crawford, Kalamazoo, Mich.; P. E. Ebrenz, St. Louis, Mo.; Geo. M. Hoffman, St. Louis, Mo.; C. K. Reifsnyder, St. Louis, Mo.; Charles E. Adams, Cleveland, O.; W. P. Champney, Cleveland, O.; W. K. Lanman, Columbus, O.; George S. Brown, Cincinnati, O.

Committee on New Members, Southern Division—C. O. Wrenn, chairman, Norfolk, Va.; R. J. Corbitt, Henderson, N. C.; George Hackney, Wilson, N. C.; Thomas B. Tyson, Carthage, N. C.; C. O. Summers, Barnesville, Ga.; Henry M. Shaw, Oxford, N. C.; B. B. Lynch, Baltimore, Md.; Julius W. Gresham, Griffin, Ga.; Julius H. Jahnz, Charleston, S. C.; J. L. Dann, Tullahoma, Tenn.; Andrew Reitz, Wheeling, W. Va.; J. W. Anderson, Rock Hill, S. C.; D. P. Hale, Anniston, Ala.; J. Frank Hutcheson, Cincinnati, O.

Committee on New Members, Eastern Division—L. E. Hickok, chairman, Mechanicsburg, Pa.; R. A. Paules, York, Pa.; A. N. Parry, Amesbury, Mass.; E. M. Galbraith, Cincinnati, O.; C. C. Bradley, Jr., Syracuse, N. Y.; James H. Birch, Jr., Burlington, N. J.; William Gerhab, Philadelphia, Pa.; R. C. Ware, Philadelphia, Pa.; Edwin F. Rogers, Philadelphia, Pa.; H. K. Porter, Everett, Mass.; John J. Nicholson, Newark, N. J

GOOD WORK BY TECHNICAL SCHOOL

The Technical School for Carriage Draftsmen and Mechanics, at 20 West 44th street, New York City, closed its fall term on December 22 for the Christmas holidays, to open again on January 5, 1914. The number of students enrolled is 57, which is a larger number than ever before since the school was opened in 1880. The attendance for the fall term just closed is 89⅓ per cent. in the evening, and 99⅛ per cent. in the day class. More students were entered in both day and evening classes, when the winter term opened on January 5, 1914. All inquiries in reference to this school should be addressed to Andrew F. Johnson, 20 West 44th street, New York City.

WOOD FOR VEHICLES AND PARTS IN NEW YORK

This industry ranks tenth in output among the state's industries, consuming a total of 30,633,100 feet and paying at the average cost of $43.95 per thousand. As a general rule high grade material is demanded. Clear stock of the best species of hardwood are in great demand. It is noticeable that state woodlots supply considerably over 50 per cent. of the raw material demanded, while the first ten species, in the order of their importance, are found in great abundance at home. Hickory, naturally, leads all species. It is perhaps the most nearly indispensable wood in the United States and none is known anywhere that will satisfactorily take its place for slender handles and certain parts of vehicles. Its scarcity is attracting national attention among wood users. The National Hickory Association has made a serious study of the problems of utilization and marketing of hickory for the purpose of avoiding extreme waste and gross misuse of hickory. Other woods should be substituted wherever possible and thus reserve the present hickory supply for the production of such articles as depend entirely upon hickory. Many parts of vehicles depend entirely upon hickory. Among its important uses are the following: Spokes, buggy poles, cross-bars, doubletrees, neck yokes, rims, shafts, singletrees, wagon gear (reaches), and small vehicle spokes. Light buggies must have slender hickory spokes where great strength must be combined with slenderness. It is very strong, very heavy, very hard and very stiff and is capable of withstanding the severest thrust or twist. White oak and ash follow closely in importance in the industry and are used in many places where hickory is used except that they are used in larger dimension stock where resiliency and slenderness are not so important. Wagon hounds, felloes, bolsters and poles are favorite uses for oak and ash. Yellow poplar is used along with several other woods for wagon boxes and it is a favorite wood for automobile bodies, dividing honors with ash. Vehicles drawn by horses consume the major portion of the raw material, but automobile stock, warehouse trucks, etc., are included in the industry.

The form of the raw material required for all branches of this industry varies so greatly that details cannot be given. A few specifications will give a general idea of certain grades and dimensions required and which should be supplied by local woodlots.

Article.	Dimensions required.
Wagon axles	Squares 2¾ x 3¾ in. to 6 x 7 in. and 6 ft. long.
Wagon bolsters	Squares 3 x 4 in. to 4 x 6 in. and in lengths 4 ft. 1 in. to 4 ft. 6 in.
Wagon reaches	Squares 2 x 4 in. to 2½ x 5 in. and in lengths 8 ft. 10 in. to 14 ft.
Wagon poles	Squares 2½ x 4 in. tops to 4 x 4 in. butts and 12 ft. long to 3¼ x 3¼ in. tops to 3¼ x 5 in. butts and 12 ft. long.
Wagon eveners	Squares 2 x 4 in. to 2½ x 5 in. and in length 4 ft. 2 in. by 4 ft. 6 in.
Singletrees	Squares for turning to be 2½ x 3 in. and 36 in. long.
Neck yokes	Squares for turning to be 4 x 4 in. and 44 to 48 in. long.
Felloes	Squares for sawing may be made from short, clear cuttings 10 to 14 in. wide and from 24 to 30 in. long.
Hub stock	In the round for turning. Blocks to be 9½ to 12 in. in diameter inside of bark and 12 to 15½ in. long.
Spokes	Squares for turning to be approximately 2 x 2½ in. and 30 in. in length.
Boxboards	9 to 17 in. in width and 12 to 16 ft. in length.

The general wagon industry includes all business and pleasure vehicles from the light delivery wagon of the bakery to the heavy trucks employed in hauling stone and timber. Much of the heavy turned stock comes from the central southern states in a partly finished condition to be used for spokes, rims, shafts and tongues. In Arkansas and other central southern states many factories specialize in vehicle stock and shipments are made in some instances ready for the assembler and the shipper practically completes the work. New York wood users are not given credit for the consumption of all material purchased because much hickory and oak stock goes north to New York in practically finished form. The magnitude of the general vehicle industry in New York is not readily realized by a study of the amount of wood consumed. The assembling business is very large in the state, while the production of metal parts is of still greater importance. Much substitution has gone on in this line of work, especially in the production of lighter buggies and automobile bodies. Many automobiles have almost no wood in their makeup. One large manufacturer reports that he has reduced the amount of wood used to nine board feet and this small amount consists of mahogany, birch, maple and black walnut trimmings. Some machines have mahogany dash boards. Yellow poplar in the form of veneer is growing in popularity against metal for automobile bodies in many establishments and it looks as if the consumption of wood in the automobile line will increase rather than decrease from now forward. White oak, hickory and ash are essential in the running gear, automobile spokes, etc.

The consumption of over 30,000,000 feet of wood annually for the manufacture of vehicles places New York among the leading states in this industry. A few states, including Illinois, consume a greater amount of raw material, but very few states contribute as much as New York does from home woodlots. Eleven million feet taken from local citizens throughout the counties is an important item in the lumbering interests among the timber owners of New York.

Thirty-two specimens contribute to the industry and New York has an abundance of all the species that are most needed. The state contributes over 2,000,000 feet of ash, nearly 2,000,000 feet of hickory and over 1,000,000 feet of sugar maple. Basswood, birch, beech, elm, chestnut and spruce are available at the doors of nearly all of the manufacturing establishments at prices ranging between $16.77 for chestnut to $37.63 per M. for birch. Mahogany is the highest priced wood, at $138.74, while black walnut at $87.45, Douglas fir at $70 and yellow poplar at $62.90 per M. feet are the next most expensive. The average price of all woods is $43.95 per M.

Vehicles and Vehicle Parts

Kind of wood	Quantity used annually Feet b. m.	Per cent.
Hickory	6,874,350	22.44
White oak	5,134,750	16.76
Ash	5,128,000	16.74
Yellow poplar	2,701,900	8.82
Red oak	2,586,200	8.44
Sugar maple	1,984,400	6.48
Basswood	1,622,450	5.30
Birch	1,455,000	4.75
Beech	718,000	2.34
Elm	441,950	1.44
Longleaf pine	419,300	1.37
Chestnut	271,200	.89
Shortleaf pine	253,500	.83
Spruce	253,000	.83
White pine	181,100	.59
Cottonwood	136,000	.44
Mahogany	90,500	.29
Douglas fir	87,500	.28
Silver maple	80,000	.26
Loblolly pine	60,000	.20
Cypress (bald)	37,000	.12
Hemlock	24,000	.08
Walnut (black)	23,100	.07
Western white pine	23,000	.07
Cotton gum	15,000	.05
Pitch pine	15,000	.05
Cherry (black)	5,900	.02
Red pine	5,000	.02
Red cedar	2,000	.01
Sycamore	2,000	.01
Applewood	1,000	*
Butternut	1,000	*
Total	30,633,100	100.00

* Less than 1/100 of 1 per cent.

STANDARD MOTOR CAR GUARANTEE

The Automobile Chamber of Commerce, Inc., New York City, has adopted a standard form of warranty for passenger and commercial vehicles. The form of guarantee is as follows:

Standard Warranty for Passenger and Commercial Vehicles Approved by the Automobile Chamber of Commerce, Inc., New York

This is to certify that we, the..... of....., warrant each new motor vehicle manufactured by us, whether passenger car or commercial vehicle, to be free from defects in material and workmanship under normal use and service, our obligation under this warranty being limited to making good at our factory any part or parts thereof which shall within ninety (90) days after delivery of such vehicle to the original purchaser be returned to us with transportation charges prepaid, and which our examination shall disclose to our satisfaction to have been thus defective; this warranty being expressly in lieu of all other warranties expressed or implied and of all other obligations or liabilities on our part, and we neither assume nor authorize any other person to assume for us any other liability in connection with the sale of our vehicles.

This warranty shall not apply to any vehicle which shall have been repaired or altered outside of our factory in any way so as, in our judgment, to affect its stability or reliability, nor which has been subject to misuse, negligence or accident, nor to any commercial vehicle made by us which shall have been operated at a speed exceeding the factory rated speed or loaded beyond the factory rated load capacity.

We make no warranty whatever in respect to tires, rims, ignition apparatus, horns or other signaling devices, starting devices, generators, batteries, speedometers or other trade accessories, inasmuch as they are usually warranted separately by their respective manufacturers.

In witness whereof, the said company has caused this warranty to be signed by its duly authorized officers.

....

Treasurer President

Date.....191

ST. LOUIS ASSOCIATION ELECTS OFFICERS

The December dinner and meeting of the Implement, Vehicle and Hardware Association of St. Louis, was held at the Planters Hotel, Monday evening, the 8th. The annual election of officers resulted as follows: President, H. P. Hubbell, manager Cambria Steel Co.; first vice-president, J. F. Murphy, manager Emerson-Brantingham Co.; second vice-president, J. D. Cathey, president Regal Buggy Co.; third vice-president, C. F. Batchelder, John Deere Plow Co.; secretary and treasurer, Geo. B. Ogan, Geo. B. Ogan Sales Agency.

A report was read by Geo. B. Ogan, secretary and treasurer, outlining the excellent work accomplished by the association during the year 1913. This summary was most complete, giving the financial standing of the association, and also noting the fact that the membership had increased from 58, December, 1912, to 72, December, 1913.

DEALERS' CONVENTION DATES FOR 1914

Following is a list of the convention dates thus far selected by implement dealers' associations:

Mid-West Retail Implement and Vehicle Dealers' Association, at Omaha, Neb., January 6, 7, 8 and 9.

Western Retail Implement and Vehicle Dealers' Association, at Kansas City, Mo., January 13, 14 and 15.

Minnesota Retail Implement Dealers' Association, at Minneapolis, Minn., January 14, 15 and 16.

Pennsylvania and New Jersey Retail Implement and Vehicle Dealers' Association, at Philadelphia, Pa., January 14, 15 and 16.

Texas Hardware and Implement Association, San Antonio, Tex., January 20, 21 and 22.

The Pacific Northwest Hardware and Implement Association, at Spokane, Wash., January 21, 22 and 23.

Oregon Retail Hardware and Implement Dealers' Association, at Portland, Ore., January 27, 28, 29 and 30.

North Dakota and Northwestern Minnesota Implement Dealers' Association, at Fargo, N. D., February 3, 4 and 5.

New York Retail Implement and Vehicle Dealers' Association, at Syracuse, N. Y., February 4 and 5.

Virginia and North Carolina Retail Implement, Machinery and Vehicle Dealers' Association, at Raleigh, N. C., February 11 and 12.

PERSONAL MENTION

H. A. Oswald, formerly superintendent of painting, trimming and enameling for the Flanders Mfg. Co. and the Hudson Motor Car Co., is now connected with the Sherwin-Williams Co., Cleveland, O., as special representative.

A. F. Marshall, of Coventry, England, who for the last ten years has been affiliated with the Paul Daimler Co., England, has joined the engineering staff of the Moline Automobile Co., Moline, Ill. He will act as chief inspector for the new 50 horsepower Moline-Knight engines.

J. F. Landolt, for many years past with Berry Bros., will represent the Moller & Schumann Co., of Brooklyn, N. Y. He will make his headquarters in St. Louis, Mo., looking after their interests in that city and southern Illinois.

James S. Beatty, who has been calling upon the vehicle trade for many years, is now on the selling force of the F. S. Carr Co., Boston, Mass. His territory is the south and central west.

W. E. Laidlaw, for 15 years on the road for the Royer Wheel Co., has resigned to travel for Zwick & Greenwald, of Dayton, Ohio.

WHAT THE S. A. E. HAS DONE

Howard Marmon, president of the Society of Automobile Engineers, stated in his annual address delivered at the Automobile Club of America, that remarkable strides in the standardization of parts and design had been made during the past year under the S. A. E. adminstration.

He declared further that there is much more to accomplish in making simple and more economical the production of automobiles in the United States, to which end the S. A. E. is taking the leading part in its exhaustive researches.

Much interest was attached to President Marmon's announcement that another and second trip to Europe by members of the society was being seriously considered for the coming fall. The expedition of 1911 was a great success and opened up new international engineering ideals and commercial relations that have proved of great benefit to the automobile industry here and abroad.

TRI-STATE DATES FOR 1914

The Tri-State Implement and Vehicle Dealers' Association has notified the Cincinnati Chamber of Commerce that it will hold its 1914 convention in that city from October 19 to 24.

WILL MANUFACTURE DUMP WAGONS

The Watson Wagon Co., of Conastota, N. Y., has engaged in the manufacture of five-ton trailer dump wagons, to be used in connection with motor trucks.

The New York Automobile Show

The change of quarters of the New York Automobile Show to the building absurdly named Grand Central Palace, was a great improvement on the facilities afforded by the Madison Square Garden in New York City.

The easy means of inspection given by the open and well lighted floors must have been appreciated by all visitors.

Those who had "parts" and accessories to display were never so comfortably situated. In the evening the lighting was especially good. The attendance seemed to be steadily large, and if the statements of sales made were even three parts true, the exhibitors must have been well satisfied with both opportunity and investment in space.

With no intention to do more than give surface impressions, we think the most outstanding feature was the excellent values in cars for the money asked. We don't think it has before been equalled.

No matter what the ideas of the purchaser, his money would buy more and better car than at any previous time.

The body styles ran to a certain sameness of type, but the finish was always good enough, often excellent, and sometimes as good as could be produced. The design of the streamline, developed in Germany, seems to be running strong. Its non-resistant surfaces are just what are wanted by the speed enthusiast.

There is general agreement that the running board should be cleared of the loads that used to encumber it, so the spare tires very generally go to the rear, either tied on behind or cuddled into made-to-order cupboards in the rear body. The tool chest disappears in like manner.

The interior furnishing and fitments run the gamut of luxurious extravagance to comfortable utility. It is hardly likely that some of the trimmings of interiors were more than freakish fancies, copied through suggestion from "period" drawing rooms, with movable chairs in place of fixed seats, and still other novel dispositions that seemed little like a vehicle interior.

Those who confined their efforts to normal trimmings were lavish of the best leathers and cords, braids and laces, mostly for show purposes, we supposed. There was a disposition to make the spare seat more comfortable. It carried arms and better cushions and upholstery in many instances. This will be appreciated by those who are guest riders.

The arrangements of seats showed a break away from the conventional in some cases, as when the front seats are separated to allow of approach from the rear inside seats without going outside the vehicle.

Fuel tanks under seats are being removed to cowls, which seems excellent practice.

Metal for bodies seems the general practice, and the way it is worked up in some examples seems like the highest art of manipulation.

The Locomobile exhibited a Berline that was the feature body work of the show. Not only was it an example of expert metal treatment, but its interior wood inlaying, its upholstery of expensive stuffs and the disposition of lights, etc., made it more like a reproduction of a rich man's parlor. It was fine and remarkable but not quite what is to be looked for in coach building. It would look something awful after a campaign, and it is suitability to purpose that is the real true note in such things.

The "one man top" development is coming along rapidly. Several good ones were to be seen. It is easy now to manipulate this kind of shelter.

The small car and the car of light weight is fast asserting its prominence. It will not be many seasons before it will hold the center of attention.

The combination of light weight and low price is now trying to work out its equation, but below the $500 Ford the offerings are not much to be wished for, as yet. One of the especially heralded cars is a very trashy production, and if it makes its way it will be a great testimony to the force of printer's ink.

At a couple hundreds or so over the Ford price there are cars of high excellence, and wonderful values compared with a few seasons ago. The Briscoe production is a notable example of the point. This combination of American and French ideas, worked out mechanically by the Frenchman, is a very fine achievement. It ought to make its way.

The mechanical details of the cars also show an advance in all the niceties of manufacture, and a desire to reduce the parts that can be made superfluous. The engines are probably more effective, and no doubt less troublesome. There is a tendency toward small cylinders and extra long stroke. This is the practice in England because the collector of tithes has made it so. If it doesn't work out so well here, and we think road conditions will prevent, we can at least enjoy the delights of imitation. For some of us that is a lovely sensation.

The sleeve valve engine was specially well staged. One of them, the Moline-Knight, had just returned from a record-breaking engagement at the Automobile Club of America test, and was generously billed as the champion, and all sorts of "dares" backed with money, were flaunted in the faces of the poppet valves. They would have to be good ones to do what the Moline did.

The French invented sleeve valve, named the Magic, was perky also, and a new idea of Weideley, by which the poppet valve was stripped of a good many of its parts, was much studied. It looks as if the conventional engineer who follows established practice just because it is established, was again about to be shunted onto the siding of conventional things, while the progressive fellow occupies the main track.

The effort to get down to a low price is going to make a revolution. The industry appears to be entering a most interesting stage out of which something should come different and better than anything we now have.

HARD TIMES TALK IS BOSH, SAYS McCURDY

Asked by a local paper to give his views on the outlook of business, W. H. McCurdy, president of the Hercules Buggy Co., at Evansville, Ind., expressed himself as follows:

The bankers, the brokers, the railroad magnates and all who have talked and written on this subject seem to predict boldly or between the lines, that we should not anticipate better conditions for months to come.

The currency law, the tariff law, the income tax, the possible anti-trust prosecutions and the present trouble with Mexico are generally used as reasons for the pessimistic views that are being expressed. I must admit that I am not in sympathy with these predictions.

The currency reform act has every appearance of being a workable plan to which the national and state banks can conform without lasting damage to the legitimate profits to which such institutions are entitled. My confidence in the plan is such that I predict an early return to tranquility in financial circles.

As to the tariff law, some of us will be hurt. Some will have to change to other lines of industry, but to what extent the

new tariff law will affect business generally and labor in particular remains in the domain of conjecture.

The anti-trust prosecutions has been with us for the past six or eight years and we may confidently assume that we have passed through that part of the reconstruction period that really hurts.

The income tax is a plan to take from those who are able to pay and to apply the taxes for the benefit of those who are not so independent in this world's goods.

The threatened trouble with Mexico is a disturbing feature. The stand taken by the present administration places a great responsibility on this country but the precedent established by the United States in her final adjustment of troubles with Spain and Cuba gives such assurances to the whole world that a happy conclusion will be reached in Mexico and that the administration feels that it can act with deliberation. The wisdom of the administration, I think, will eventually pacify the warring parties and establish a stable government without either great destruction of property or armed intervention on the port of this country.

These are some of the conditions which have engendered a spirit of unrest and I believe an honest expression from every business man, measured by actual experience in his particular line of industry, would give a different complexion to public thought.

Speaking of our own industry, we have good reasons to feel that our volume of business will be equal to that of 1913. There are sections over the country where there seems to be some little cause for complaint, but taking it from a broad view there are localities where the crops are abnormally large and a general average does not furnish room for complaint.

Because the railroad companies are experiencing difficulty in raising the necessary funds to keep their equipment up to the hight standard of usefulness, I believe that they should be granted the 5 per cent. advance on freight for which they are making a demand.

I feel confident that every broad minded man, regardless of his business, or his political affiliation, desires that normal conditions should obtain at the earliest possible date and if the business man will come out frankly and take a stand for progress, and if the banker will take immediate steps to conform to the new banking law, it is reasonable to predict a prosperous 1914.

SAID TO BE A VERY GOOD DESIGN

We show an illustration of an English cyclecar with parts descriptively marked on the cut. This is thought to be a very good design by those who have considered it, and for that reason we present it for those in interest.

A brief description comprises these points: Two speeds, provided by the gearbox, are ample, each with a variation obtained on the pulleys. The ratios obtained are from 4-1 to 6-1 on top, and from 10-1 to 15-1 on bottom gear. There is a separate clutch, so that the belts will last for thousands of miles, being relieved of the strain of starting the machine from rest.

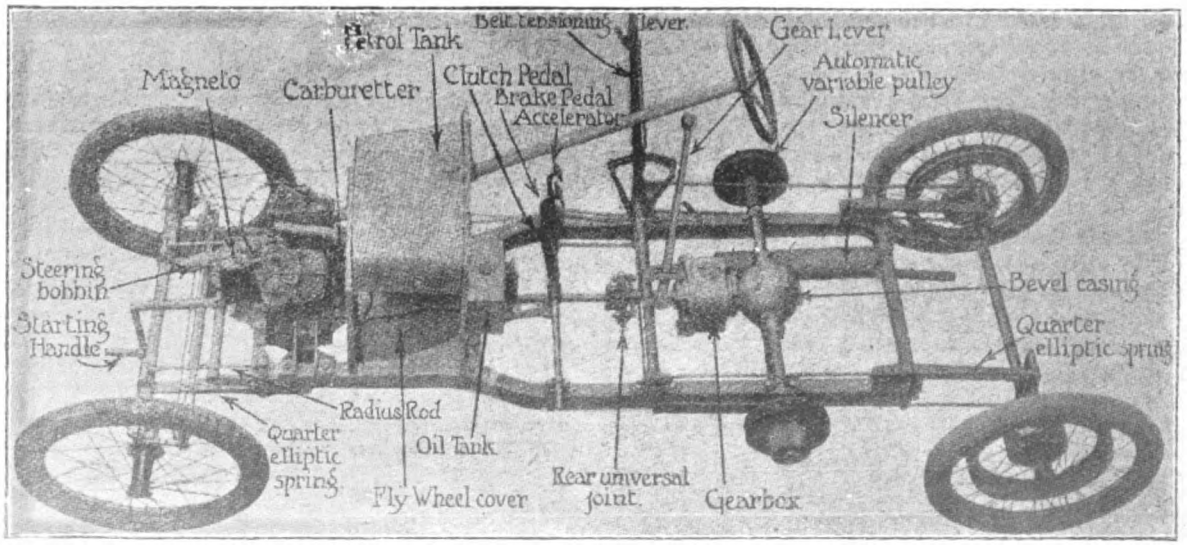
The shaft revolves in a very long bearing, which is bolted at its forward end to a cross member and, at its other extremity to the aluminum gearbox. Although this long bearing, which also serves as a means of anchoring the gearbox, is provided the shaft also revolves in a ball bearing placed close behind the driving pinion. The layshaft rotates on ball bearings, and all the pinions are of generous dimensions.

Bolted direct on to the gearbox is the bevel casing, which is spherical in shape, and made in halves, the division being vertical. The countershaft, which is totally encased, revolves on four ball bearings, two of which are placed in the bevel casing, the remaining two being at the extremities. Ball thrust washers are also provided to take the thrust from the bevels. At each end of the countershaft a 9 in. variable pulley is fixed. The outer flange of each pulley is pressed against the inner one by a large coil spring enclosed inside the boss on the outside of the pulley. In the normal position, therefore, the high gear is in action, but by tightening the belts, which is effected by moving a lever, the flanges are forced apart, and the lower gears are obtained. The design has this advantage, that on low gears the belts are under tension, while on high gear they are not unduly tightened, which should increase their life.

The springing, both at the front and the rear, is similar to that used on the Grand Prix Duo—Mr. de Peyrecave being the designer of the latter machine. At the rear the quarter-elliptic springs are bolted rigidly to the frame, while their rear extremities act as fulcrums for two special clips, about 6 in. in length, which are fixed at one end to the axle. At the other end a rod, which connects up to the tensioning lever, is pivoted. By pulling these rods forward the rear axle moves backwards and tightens the belts.

HAD BANNER YEAR

The Single Center Buggy Co., Evansville, Ind., of which Willis Copeland is manager, added a great deal of manufacturing and repair machinery to its already extensive plant in 1913. The company also repairs automobiles and carries automobile tires in stock. The company had a banner business year and is employing more men than ever in its history.



Here Is a Worth While Association, The N. A. A. H. I.

The National Association Allied Horse Interests embraces a field of sport and industry which has been given so little publicity during the past ten years that it is an almost forgotten fact in many minds that the horse did not pass out of existence when horse cars became a relic of the past.

Primarily it will betray the reverse of that picture so often seen of the poor old nag looking over the fence at the automobile dashing by; always dashing, never stalled. It intends to boost the horse in a legitimate manner whenever and wherever it can be done.

It will encourage the breeding of more and better horses, and the use of the horse in sport and industry. It will prove that his passing is only a "motor myth," and that the reason for the present high prices for the King of Sports is absolutely one of supply and demand.

It will try to convince the 6,650,000 farm operators in this country that there is more money to be made in raising colts than there is in any other product of the farm in proportion to the original outlay and consequent trouble, and it will not be averse to advocating horse racing under suitable conditions.

It will lend its influence to the promotion of more riding, driving and polo clubs in every part of the United States, and will endeavor to encourage and strengthen those already in existence. It will open the eyes of a few Americans at least as to what is being done for the horse in foreign countries in comparison with our so apparent infantile efforts here.

The officers of the association are well known horse lovers in different parts of the country. Its board of directors, not yet completed, for the association is still in a constructive state, is headed by August Belmont, who has done as much, if not more, than any other one man in the United States to encourage the breeding of high grade horses, the restoration of horse racing and the creation of interest in the economic use of the utility beast of burden.

Then there is James A. Burden, a horse lover of the highest type, a devotee of polo, and one of the most ardent believers in the future of the horse, both in this country and abroad; Dr. George C. F. Williams, of Hartford, who is convinced that a high grade livery stable in New York City would please others beside himself; T. Minor Curry, of New York, who thinks and dreams of horses, saddles and harness; J. W. Kiser, of Chicago, who is almost as well known in New York as he is in the great city by the lake; and the president of the N. A. A. H. I., Ralph C. Watrous, one-time Lieutenant-Governor of Rhode Island, and who believes, like the widow whose husband had been killed by a kicking horse (of course, having collected the insurance), that there's luck in a horseshoe.

E. W. A. Waterhouse, of San Francisco, well known the whole length of the Pacific Coast; W. H. Grant, of Kansas City, and Charles M. Roehm, of Detroit, are three of the five vice-presidents to be chosen for the five districts into which the country has been divided for the association's work.

Will the association have anything to say about automobiles or motor trucks? The old proverb, "Knock and the world knocks with you, boost and you boost alone," is just as true today as it ever was, so the hammer will not be tolerated in the association's kit of tools. But it will, nevertheless, occasionally have something to say in a dignified manner about the pleasure car as a factor in the high cost of living, and the comparative economic and commercial worth of horse-drawn and motor vehicles.

To the Horse Lover

There's a reason for everything and experience is the wisest teacher, so the N. A. A. H. I. will endeavor to collate and collaborate from time to time statistics pertaining to the horse which will be of interest, not only to its members, but to the general public.

For instance, it is interesting to note that the Adams Express Co., pioneer users of autos in the express business, starting some eight years ago, have 40 more wagons in use in New York City than a year ago. Experience has proven to them that the machine is less economical than the horse for short distance hauls.

Practically every riding school of any note throughout the country reports an increase in business during the past year, and if it was possible to state the actual increase in the use of saddle horses during the past three years, the figures would be more than interesting. The most healthful exercise in the world is creating a demand for saddle horses which horse dealers cannot fill at the present time.

The year 1913 is way ahead of 1912 in the demand for horses. The difficulty found, however, is in supplying the demand for truck as well as for driving purposes. Formerly the celebrated Morgan breed of Vermont was a never failing source of supply, but practically all of the horses handled in the east today are shipped from the middle west. The farmers of Vermont should and can be convinced that they can raise better horses than they can afford to buy, and that they can find a ready market for all surplus stock with a wide margin of profit.

High Prices Prevail

Notwithstanding the adoption of motor trucks and delivery cars instead of horses for much of the hauling done in cities and towns, and notwithstanding the steady increase in the number of improved draft horses grown in the central and middle western states until it has become one of the great and important industries of the country, yet the demand for good draft horses has increased faster than the supply, and they are bringing higher prices at market today than ever before in the history of the horse trade of the United States.

The average value of horses has increased more than 120 per cent. during the past ten years, and modern farming methods, improved farm machinery and the tendency to "return to the soil" is constantly increasing the demand for more and better horses. Such being the case, with the United States government standing ready to give its assistance in the breeding of stock which is bound to command a profit to the breeder greater than that which can be derived from any known crop, why hesitate to turn the non-productive acres into fields of profit?

This proposition should appeal to the 6,650,000 farm operators in the United States.

Horses on the Increase

The number of horse-drawn vehicles in daily use in the down town district of Chicago has increased by 30 per cent. during the last two years. It is estimated that there are daily 130,000 teams on the central business streets of that city.

Statistics gathered from eleven cities in various parts of the country show an average increase in licensed horse-drawn vehicles of 40.2 per cent. per city in 1912 over 1910, and horse cars are not being installed in many places today.

Business vs. Pleasure

The N. A. A. H. I. believes that the so often threatened displacement of the horse is a vital factor in the living expense of every citizen.

The average man, even in moderate circumstances, is less apt to pay attention to pleasure cost than he is to business cost. In fact, it is almost invariably true that we spend dollars for pleasure while we are striving for economy in business methods in every departmenet of factory, store or office.

We think but little of the expense of automobiles for pleasure; in fact, but few of us know what it really does cost to run a pleasure car; but we are willing to allow that it costs much more than the horse and carriage formerly consumed of our income, and let it go at that.

But when it comes down to business, then we begin to figure the relative cost of the horse-drawn and motor truck or delivery wagon, if teaming of any kind enters into our business transactions. Obliged as a rule to take the word of the motor truck agent as to increased business, decrease in transportation charges, quickness of delivery, etc., resulting from the displacement of horses by power vehicles, too many business men take it for granted that if an automobile carrying us over many miles of road per day can give us increased pleasures, disregarding, of course, the mere matter of cost, then it will be equally true that the motor truck will succeed the horse and bring an increase of business comparable with the increase of pleasure from automobiling.

The man who can figure that it costs less than 24 cents a mile to run an automobile, counting in depreciation for a three-year period, is an expert statistician deserving of a niche in the hall of fame. This statement does not include entertainment expense, which is no small factor in auto disbursements. If you run your car 5,000 miles a year at a cost of more than $1,200 and your salary is $2,500 a year, what's the answer?

A Misleading Endorsement

A Tennessee sand company is quoted by a large motor truck manufacturer as follows:

"Our motor truck makes six trips per day with three yards of sand or gravel, which weighs approximately 4½ tons per load, and the entire expense of dirver, gas and lubricating oil averages $3.50 per day, making a total ton-mileage of approximately 1 3/10 cents per mile. Over the same hauls with our mule teams, we could only make two trips per day of 1½ yards at a cost of driver and feed per team of $2.50."

A casual glance at this statement might induce one to purchase a three-ton truck at a cost of $3,200, but why stop figuring expense at $3.50 per day for driver, gas and oil? There's that little item of depreciation, for instance. A maximum value for a motor truck at the expiration of three years of 300 working days each would be $500, unless it should be "turned in" to the maker in exchange for a new one, and then the results will be doubtful. There should be added to the daily cost of $3.50 for driver, gas and oil, depreciation, $2.72; repairs, which increase materially after the first year, including tire expense of $2.12; insurance, light, heat and taxes, $1.01, and a number of other incidental expenses, such as time lost during repairs, increased cost of garage over barn expense, repair cost of road and numberless supplies.

However, the items enumerated amount to $9.35 per day, against the $2.50 per day for mule expense figured by the sand man, or practically four times the cost per day of the mule teams. The question is not, How old is Ann, but, Why the endorsement?

A Savannah, Ga., motor truck owner—we wish we knew his name—endorses a 1½-ton truck as follows; and, by the way, this truck is the same make as the sand man, referred to in the previous paragraph, uses:

"Before we bought our truck to deliver our goods, we secured all the information we could regarding various trucks. * * * Before we determined to buy a truck we figured carefully the expense in comparison with teams. We figured over our repair bills, harness bills and wheelwright bills in addition to our feed bills, and after a careful calculation we were convinced that a ton-and-a-half truck such as we have bought is equal to three teams, thereby saving us in expense $1,018 per year. Competition here with the local agencies was very keen, but we have arrived at our decision after a careful examination and we do not believe that anyone will make a mistake in deciding on the ——— truck."

If it costs, as is true in this locality, including driver's wages, feed, wagon repairs, shoeing, veterinary service, barn rent, depreciation, harness repairs, liability and fire insurance, etc., approximately $1,080 a year for operating a one-horse delivery wagon, and the truck alluded to is equal to three teams, the motor truck should do its three-horse work for at least three times the cost of a one-horse delivery wagon, namely, $3,240 per annum.

The actual facts are that the Savannah man who believes in motor trucks must figure his truck as costing him a minimum of $4,316 a year, against the cost of three horse delivery wagons, which could be run at an expense of $1,076 a year less. Where does the saving of $1,018 a year come in?

A Happy Motor Truck Owner

A true as well as a very interesting story is told of an ambitious Yankee who sought to enlarge his field of business activities.

A well known expressman in the city of Providence purchased a motor truck a little more than a year ago, with the expectation of trebling his business in a short time.

Much to his chagrin, he soon found that it was a more expensive proposition than his former horse-drawn delivery wagon; that it consumed more time than anticipated in the congested parts of the city; that it was difficult to manipulate in freight yards, where horses predominated; that when it was laid up for repair no substitute was easily procurable, and that in many other details it did not come up to either his anticipations or the promises of the dealer who persuaded him that it would surely treble his business.

In fact, at the end of the first year, his profits, on a greater amount of business, owing to truck express, were less than for previous years.

Realizing that something must be done to offset this loss, he conceived the idea of endeavoring to secure business for longer hauls with "return cargoes," so to speak.

The return load, one day not long ago, consisted of a truck load of hay, well-seasoned hay, hay that was destined to make some hard working horse believe that life was still worth living. In some unaccountable manner, when just outside the city limits, the hay caught fire and naturally the truck followed suit.

The owner sat by the side of the road smoking his pipe until everything destructible by fire connected with the truck had been consumed, heaved a big sigh of relief as he boarded a city-bound car, paid his fare smiling to the conductor, and exclaimed as he passed in his nickel: "This is the happiest day I've had in more than a year; that was my motor truck you saw smoldering back there where I got on, and it was insured, too."

The insurance money bought a complete horse-drawn delivery outfit, and business is good, says the expressman.

Not So Happy

One of the most prominent brewers of New England, in speaking of the auto truck in connection with his business, states that he would willingly consign his trucks to unmentionable regions if others would do the same. The excessive cost of maintenance over horse-drawn trucks is so great that a truck is maintained today solely for competitive purposes in sending a "keg" when it is apparently needed in a hurry, and horses have supplanted auto trucks in other instances.

Depreciation a Great Factor

The Engineering and Mining Journal, of October 18, has a very interesting article on the Availability of Motor Trucks for Mines.

The writer claims that a study of the results obtained make it clear that the great question in motor truck transportation is that of the tires. Second in importance is the question of repairs, and third is that of fuel consumption. Bound up with these three points are question of road surface, road grade, altitude, climate, gear ratios, first cost, wages and various points of design.

Inasmuch as depreciation is one of the greatest items of expense in motor truck cost and as interest and depreciation alike are not considered in many of the tabular presentations in this article, it would be interesting to know why they are omitted in the compilation of an otherwise most instructive discussion of the undetermined success of the motor truck, omitted, we mean, by those who furnished reports to the writer.

When a truck is sold, turned in, or goes to the scrap heap, whether the truck cost $1,000 or $5,000, a large amount in proportion to cost and previous usefulness must be charged up against operation.

That the demand for horses is increasing faster than the supply is a well known fact. Depreciation in value is an almost unknown quantity in horse statistics, unless the horse is so old that age and service have placed him beyond the period of usefulness, and even then, age and service have so far offset original cost that depreciation is out of the question.

There are innumerable cases in this country where draft horses after five years of constant service, sold for one reason or another during the past three years, have brought as high or higher prices than were originally paid for them. Such being the case, the conclusion is obvious that it will continue so for many years, no matter how active the farmers or the breeders may become in raising horses, and the business is bound to be a lucrative one if properly conducted.

Good Roads

The question of good roads is as important to the horse owner as it is to the automobilist, and the N. A. A. H. I. intends to take an active interest in solving the question of the durability and safety of waterproof roads and the extension of improvements into the more rural districts where branches of main highways are too often neglected. Apropos of good roads, an English association has started a movement well worth consideration.

The Road Improvement Association of London, England, has offered prizes in a horseshoe competition, which should be of interest not only to the good roads advocates of this country, but to horseshoe manufacturers and jobbers as well.

The object of the competition is to stimulate invention and to award prizes for the most practical and useful type of horseshoes that will provide the horse with a satisfactory footing upon improved waterproof roads (thus alleviating its sufferings) and minimize the damage at present caused to such roads by certain types of shoes at present employed.

The merits of the competing devices will be judged mainly in the provision of a satisfactory and non-slipping foothold for horses upon waterproof road surfaces now adopted upon main roads and the chief streets in our large cities and towns; the reduction in the amount of damage caused to road surfaces; and general practicability, such as capability of general manufacture, reasonable life, moderate cost and similar conditions.

The competition is not only novel, but offers possibilities of usefulness. It will receive careful consideration by the directors of the N. A. A. H. I., and it is not at all improbable that something of a competitive nature along similar lines may be proposed at an early date.

Co-operation Desired

The more than 1,200 riding, driving and polo clubs of the United States are invited to correspond with the National Association Allied Horse Interests, for it hopes to make its publications and the association alike of interest to the 125,000 members of these clubs.

There are approximately 4,500 owners of racing teams in this country who are also owners of fine country estates. The N. A. A. H. I. will be made to appeal to them from their point of view, and we do not hesitate to appeal to them for that co-operation which will make the association valuable in many ways. We do not want to use the word "co-operation" too much, but it means a lot at the beginning of a big publicity campaign as has been inaugurated by the National Association Allied Horse Interests.

As to the commercial interests which the association will serve, the eighty-odd thousand blacksmiths, the 70,000 veterinary surgeons, the more than 150,000 manufacturers of horse and accessory supplies, the 50,000 stock raisers, the innumerable farmers and that great army of citizens which is composed of men dependent upon the horse for a livelihood, it is impossible for the association to correspond with you directly, but it would like to hear from you, for the National Association Allied Horse Interests as an association, and through its official publications, means to benefit your individual business, and with your assistance it knows that much can be accomplished.

That word "efficiency" is considerably overworked nowadays, and the association is willing to admit that those who howl the loudest about efficiency are apt to be the ones most deficient in one way or another. Nevertheless the N. A. A. H. I.'s information bureau will endeavor to answer any reasonable questions which may come to it pertaining to the horse or allied interests. You do not have to be a member of the association to ask questions nor to receive an answer; no, not even about motor trucks, if you are interested. You ask; the association answers.

The headquarters of the association are in Providence, R. I., but in a short time branch offices will be established in the five districts into which the country has been divided for publicity work.

AWAY WITH IT!—THE FAN

Mr. Sturmey, in The Motor, has found the fan as part of the engine is substantially N. G., so he proposes to have it scrapped, but he overtures its departure with an argument. This is the pith of it:

Complaint was recently made of the inefficiency of the fan in securing the cooling of the water under any but the most favorable circumstances, and it was suggested that some attention should be given to blade angles, and a lesson taken from the practice and experience of the users of propellers. The suggestion is a good one, for I fancy very little attention has been given to the subject, and we know what surprisingly improved results the air navigators got when they altered the pitch of their fan blades from that which was employed on the first aeroplanes. But, when all is said and done on this subject, I question whether there is any need to consider the matter, or even to use a fan at all. For myself, I am inclined to look upon it as an anachronism.

Let us look at the matter of radiation broadly for a moment. The water, brought very near to boiling point by its passage through the water jacket, requires to be cooled to somewhere near atmospheric temperature before it re-enters the cooling system of the engine. At first we tried to do this by diluting it with a considerable volume of cold water, and did so until the fact was appreciated that air is a rapid conductor of heat, and then we had the radiator, and every effort of the inventor and designer was devoted to the problem of securing the largest amount of surface possible, both on the outside and the inside of the containing passages, coupled with the smallest volume of water in contact with the enclosing metal at one time.

Allied with this came another problem, viz., that of securing

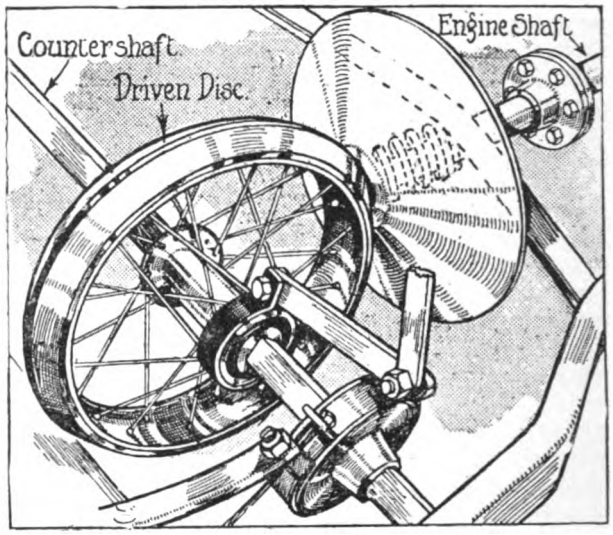
not only the largest surfaces inside and out, but of bringing the largest volumes both of air and water in contact with these surfaces during a given period. The former requirement produced the "honeycomb" radiator, with large surfaces and exceedingly narrow passages, and the latter continued the use of the circulation pump, forcing the water through the tubes as rapidly as possible, and of the fan, the function of which was to do the same with the air, viz., to bring as large a volume of fresh air as rapidly as possible in contact with the exterior radiating surfaces.

So far so good, and we came very near the theoretical ideal after which we were striving. But then came experience, and we found that the once idolized "honeycomb" construction, while coming nearest to the theoretical ideal, gave trouble, owing to the exceeding fineness of its passages and its delicacy of construction; so that we have very largely reverted to the somewhat less theoretically perfect but more practical gilled tube system. Then, again, those who aimed at fewness of working parts always looked askance at the circulating pump, which was, from the first, a source of trouble, and once again the practical triumphed over the theoretical, and thermo-syphon circulation is a recognized system used in perhaps the majority of new cars. But the fan survives, and we are now grumbling at its inefficiency. Like the pump, it is another working part taking power from the engine, and a source of trouble. Its purpose is to increase the volume of air passed over the surface of the radiator, and, when it was first introduced, it was very necessary. At that time engines could not be run slowly (as we understand slow speed now); they were much harder to start than they are now, with the result that we left our engines running when we stopped our cars, and they were roaring along fairly fast too, not inaudibly "ticking round," as is the case today.

This was where the real need for the fan came in. When a car is moving, particularly if it be moving fast, the fan, as a rule, is really not of very much service, the radiation being effected by the rapid passage of the radiator through the air, which, of course, brings a constant supply of fresh air in contact with it, and the faster the speed the greater this will be, so that the call for more radiation to meet the production of greater heat by the combustion of the larger quantity of fuel required to give the increased speed is automatically met by the increased speed itself. In practice, it works out that, with modern engines, the fan is not really of very much use unless the car be crawling up a long hill on a low gear, with a following breeze, and, latterly, some constructors have argued that a little increase in the size of the radiator—in other words, of the surface area—will meet the requirements of even these exceptional circumstances, without the need for a fan at all. Curiously enough, this theory has been put in practice most by the makers of commercial vehicles, whose cars travel at a much slower speed than do touring cars, and whose engines, owing to low gear ratios, are both larger and running much faster than those in touring cars. With all those who have tried it, the experiment has been entirely satisfactory, so why should we be bothered with the fan at all? As a matter of fact, I have not used a fan myself for about seven years, so I speak from experience. About seven years ago I was engaged on the design of a series of cars for both passenger and commercial purposes, and, always a stickler for simplicity and fewness of parts, I abolished both circulating pump and fan, at the same time slightly increasing the surface area of the radiator. The experiment was entirely satisfactory, and although the touring cars of the firm had a 5-to-1 top gear ratio, using two speed gears, I have run for an hour together at over 30 m.p.h. in the summer without any indication of overheating. So, with this experience to fall back upon, I repeat what I have already said, that both pump and fan are anachronisms and can very well be—both of them—abolished. Where trouble is now experienced, I fancy it may often be due to the selection of some fancy shape for the radiator, which not only does not allow of sufficient radiating surface being given; but very often disposes what surface there is most inefficiently.

A DIFFERENT FRICTION DRIVE

The friction drive will be easily understood by reference to the illustration. The driving disc consists of a hollow cone, composed of a mixture of aluminum and copper, and is mounted on a shaft in line with the engine, which is set parallel to the channel steel frame. The driven disc can be moved sideways along the squared countershaft, which carries belt pulleys at its extremities. The disc has a V-shaped face in place of the ordinary flat surface, and the rim is spoked to the hub in much



the same way as a road wheel is attached to the hub. The coned driving disc is pressed into contact with the driven disc by means of a strong spring, a squared shaft allowing for longitudinal motion for the various ratios.

A number of advantages are claimed for this form of drive. The spring pressure varies directly with the gear ratio, thus the tendency to slip on the low gears is minimized. The line of contact between the discs is at a proportional radius from the center, and thus a true rolling contact occurs, with no slipping, as is the case with the ordinary flat disc.

The final transmission is by long belts to the rear wheels, running over large, solid pulleys. A foot-controlled band brake is fitted to the countershaft, while the side lever operates shoe brakes on the rear belt rims.

DECEMBER MEETING OF CINCINNATI CLUB

The Cincinnati Carriage Makers' Club held its twenty-seventh annual dinner at the Business Men's Club, December 18. Over 150 members were present. The evening was devoted to feasting, music and speaking.

Mayor-elect Frederick S. Spiegel in his address stated that "the carriage trade is going forward right along, and that the city of Cincinnati is expending just as much as she ever did for the maintenance of her horse-drawn vehicles and shoeing of horses." Earl M. Galbraith, of the Anchor Buggy Co., addressed the club on "The Carriage Business." Val. Steinle, of the Stewart-Mowry Varnish Co., and his daughter, Miss Jessica Steinle, were very entertaining in their song selections. George Mann, of the Wirthlin-Mann Co., with his comical songs and sayings, parodies on the members of the club, took the audience by storm. Will J. White, of the Diamond Rubber Co., and Fred. Guckenberger, of the Jacobs Cordage Co., rendered solos which would be a credit to any operatic stage.

The finale, "America," by the club, concluded the entertainment.

It was one of the best meetings ever held by the club.

Paint Shop

MIND YOUR VARNISH

Varnish is like human nature. New traits are constantly showing themselves. And like nature its life story promises to go on to the end of time with ever new chapters passing in review.

The fact that it is the final and not the least important material applied to the carriage, and that upon its capacity for both beautifying and protecting the surface, the painter's success chiefly depends, is the one reason, above all others, why such unusual interest attaches to this expensive and delicately organized material.

From the practical standpoint, at any rate, there is something verging upon the mysterious in the composition and attributes of varnish. Even the chemist with his trained vision into the recesses, which lie beyond the pen of the layman, is not always sure of his ground when foraging amid the green fields of experiment in varnish. Not infrequently he finds himself groping in the dark. No sooner is one issue in respect to some one of the apparently infinite elements of varnish settled than another one, comet like, shoots across the horizon. Hence arises this constant investigation, in laboratory and varnish room, having for its result the development of greater uniformity in the excellence of the varnish and in the character of the finish attained from its use.

No material used in vehicle painting is called upon to represent so many fairly conflicting virtues, and no material comes so near representing them successfully as varnish.

Like the apostle of old, it must verily be all things to all men, working in good or evil hours, and in an environment ill adapted to its proper use, quite as often as not.

However, painters know this phase of the subejct. What the practical man needs to know and should not forget, is that varnish needs, first of all, a square deal. It cannot be abused, and made to produce satisfactory results. There is no middle ground. The apartment in which the varnish is used—and this term, by the way, is intended to cover all varnishes—may well be esteemed a place in which the supreme law of cleanliness is rigidly enforced. It should, moreover, be literally fashioned into the image of what the ablest French chemist has described as a "tower of light." The effect of light upon the drying of varnish, and upon the development of brilliancy, and of those other scarcely less important virtues, is a matter of common knowledge among craftsmen. It is chiefly because they do not elect to exercise that knowledge that dark varnishing quarters continue in well equipped paint shops.

And in the matter of ventilation how neglected the painter has been, as a rule. While men in other industries have attended energetically to this important source of human happiness and success, the brush wielders have been slothful.

Varnish thrives upon ventilation if secured in the right way. A traveling salesman visiting carriage painters throughout a large section of the country found less attention paid to proper and adequate ventilation of the paint shop than to any other factor associated with shop management. A poor commentary upon the professional alertness of the trade. Between the ill ventilated varnish room, or the varnish room with possibly no ventilation at all, and the room with even that crude ventilating contrivance. the raised or lowered window sash, there is a prodigious barrier with the advantage entirely with the window system of ventilation, since with the latter it is possible to get a direct supply of fresh air at times.

The value of a dry, warm room in which to lay or flow the varnish, and then to dry it, need hardly be here reviewed in detail. Slow drying of a variable nature, with a pronounced lack of uniformity, attends a varnish used and exposed upon a surface housed in the damp and insufficiently heated apartment. And the last state of that varnish, it may fairly be surmised, is quite as bad as a vivid imagination can picture it. For the room lacking in heat and dry air there is positively no excuse, nor should any be needed, for no such room should be permitted to exist. Verily all these things have intimately to do with varnish in its relation to the finished vehicle. They cannot well be ignored without paying the penalty, which must ever be exacted from the improvident and the unconcerned. To fully recognize the relationship of varnish to the finished vehicle, is to lay hold of every resource by which varnish is made to develop all the royal virtues wrought into its composition by the manufacturer.

WHAT HE KNOWS ABOUT VARNISH

Some time ago, an esteemed correspondent, W. A. R., relieved his mind about varnish and varnishing in the way we are now quoting him. He writes:

I am writing what I know (or think I know) about varnishes, or rather, their use. I know very little about pigments, or the making of varnish and color; but, I know a little about how they work.

If I knew how they were made, and could use big words, and was well educated, I would not have to work at carriage painting; but, as I am one, I try to take an interest in my work, and use the best methods possible.

Some painters advise mixing varnishes; that is, mixing a slow drying varnish with a quick one, so that the work may dry quickly in the winter time.

I claim that this will not work well. If you mix it yourself it will dry in spots, and will not be uniform. I have done this, for instance, mix black varnish and gear or body varnish, and use it on top irons and old buggy bows; but it does not dry together. Would any body finisher put rubbing varnish in his body varnish to produce a nice job? If he did, the rubbing varnish would set, and the body varnish would keep coming out.

I have used gear varnish on a cheap body, where I did not mind a few brush marks—but, on the whole, all good painters agree that when they mix varnishes they are taking chances.

There are many quick drying varnishes now on the market, which will do satisfactory work in the winter time, or on damp days.

I think varnish is like whiskey, it is pretty fair as it comes from the manufacturer, but if doctored or mixed, then what?

Another thing, the maker puts in all the turpentine that the varnish will stand. Put in more, and it is spoiled. I took a job once, and the painter, whose job I filled, had mixed his varnish in quart fruit cans.

He had left about two gallons of this stuff and the boss wanted me to use it on bodies. I would not do it. The other man's work certainly showed what he had done.

I see some articles in papers about varnish "going dead." I know nothing about atmosphere or defective timber, but I know this, most of the big shops will prime their wheels and bodies just as they come.

Anyone knows that the grain will raise as soon as they strike the air. They should be sandpapered well before they are primed, and the priming should be merely good linseed oil and white lead—no coloring and no japan.

After this is well dried, you can hurry as much as you please with your other coats and will not have much trouble. For quick work, cut out lead, except what is in the roughstuff.

Rubbing varnish too close is one of the greatest reasons why varnish "goes dead." Most shops rub the varnish to the quick, all the coats are rubbed so thin that when the job is ready to finish, there is nothing to hold out the finishing coat. No wonder it goes dead. It would go dead on a glass foundation, if there is not another varnish under it.

Of course, if the under coats are not dry where varnish is put on they will dry together and will have no lustre. I have seen good work in warerooms look lifeless, and one could see clear through it. The varnish did not look deep and good.

To get a good finish rub your filler well, then put on two coats of drop black, then a straight coat of black varnish. Get it clean, with no sags, and do not rub it. Just moss it. Put on another coat and rub lightly.

Let the body stand a day and a night to sweat out, then rub well. Wind up with a water rub; let stand till next day, then see what a nice finish you will have. It is the workman as much as the varnish, in my opinion; and, when I get a bad job, I can look back and see where it started from. Can you?

SUCCESS IN VARNISHING

All brushes and tools used in the application of varnish should be the best quality of their respective kinds. The man who uses a second quality varnish brush is unworthy of the name of craftsman. The man who starts upon an important varnishing job with a new brush should be allowed to use nothing but a putty knife until he learns better.

Even the best brush takes some "breaking in" before it is fit to take its place as a perfect tool for best work. The man of common sense will have in his kit brushes in various stages of education, the raw fledging brush, the brush that is partially broken in and the perfectly disciplined and accomplished brush! These he will use as circumstances arise and the nature of the work warrants. Varnish brushes should be treated as dear friends; they are the varnisher's stock-in-trade, and one of the principal aids to his success. The man who uses a brush for green paint one day and for front door varnish the next, though possibly an estimable member of society, has mistaken his vocation.

Scrupulous care in keeping all brushes, cans, and all the equipment of the varnishers' trade is absolutely essential. As a distinguished decorator teacher has said, "It is easier to keep clean than to make clean." Therefore a varnish brush or a can for holding varnish should never be allowed to become dirty. Once a brush has been broken in sufficiently to warrant its adoption for finishing best work it should spend the rest of its days in varnish and preferably one kind of varnish. It almost goes without saying that such a brush should be perfectly free from every trace of dust, grit, "nibs," pieces of skin, dead flies, and all that blemishes or mars the appearance of a varnished surface.

If much work is done with very pale varnishes special brushes should be kept for them as it is a much more difficult matter to clean a brush that has been used in Copal varnish to the degree necessary to permit its being used in white varnish than many people imagine. To the writer's knowledge, says Dennis Clifton, in Painter and Decorator, several complaints of the color of finished varnish work were simply attributable to this fact.

The varnisher may use varnish that is beyond reproach; he may employ the best and most carefully prepared brushes, he may be cleanliness personified, and yet is liable to that greatest of all annoyances, dust. The extent to which those minute particles which float in the air and to which we give the general name "dust" are responsible for the ruination of much excellently executed varnish work is really surprising. Dust is of two kinds. There is the sandy or gritty dust met with in the open air which settles on the panels of that front door which we took such pains over. Obviously we are here in the hands of nature, and all we can do is to circumvent her if possible by selecting a time for our operations when the disadvantageous conditions are at their minimum.

Even still more annoying and in certain cases more difficult to deal with is interior dust. In this case the particles of dust are usually fine hair or particles of wooly matter. Successful varnishing is an absolute impossibility where dust of this nature is plentiful. A room which contains a deposit of dust on shelves or furniture is never a satisfactory place to varnish in even when the dust is apparently at rest. Here again the secret is cleanliness.

No apartment is fit to conduct fine varnishing operations in until it has been thoroughly cleaned and freed from all traces of adherent dust and fluff. If then a good current of air is allowed to blow through it, and it is then closed up over night, it is usually safe to varnish in.

PRIMARY COLORS AND THEIR CHANGES

There are but three colors, blue, red and yellow; they are known as the primary colors, and out of these all colors are made.

Shades are the tone of a color, produced by the addition of black to the normal color. Tints are the tones of a color produced by the addition of white to the normal color, so that a shade of a certain color is darker, and a tint of the same is lighter.

We are told that light is the source of color, and on examination of its composition we find that the laws of contrast of colors are entirely dependent on light.

When a ray of sunshine, or white light as it is termed, passes through a glass prism, it is separated, and if the image formed is received upon a white screen, placed at a suitable distance from the prism, it will be found to consist of various colors, arranged in a certain order like those of a rainbow. The colors are six in number, three of which are primary and three compound, resulting from the admixture of the primary colors in pairs. The blue, red and yellow are the primary colors, and the green, violet and orange the compounds or secondary colors, which result from mixing two of the primaries. There are still three other colors, called tertiary colors, which can be composed of either two secondary colors or the three primaries, namely, citrine, composed of green and orange, or of a predominant yellow, with blue and red; russet, composed of orange and violet (or purple) or of a predominant red with blue and yellow; and olive, composed of violet and green, or of a predominant blue with yellow and red. White and black are termed neutral colors.

Having thus proved that light is the source of color, mixing of the colors must be performed where a good light can be obtained. We must have recourse to material colors, though none of these are so pure as any of the colors of the spectrum. We find that even ultramarine, that approaches nearest a prismatic color, has a tinge of red in its composition, causing it to appear violet. Again, it should be borne in mind that there is no pigment so permanent that nothing will change its color, nor any color so fugitive as not to last under some favoring circumstances. Time has generally the immediate effect upon color as fire, according to the laws of combustion and chemical agency. If fire deepens any color, so will time; if it cools or warms it, so will time; if it varies it to any other hue, so will time; and if it consumes or destroys a color altogether, so also will time. That there is no absolute but only relative durability of color may be proved from the most celebrated pigments. Thus, the color of ultramarine, which under the ordinary circumstances of a picture, will endure centuries, and pass through naked fire uninjured, is soon destroyed by the juice of the lemon or other acid. So again, the carmine or cochineal, which is very fugitive and changeable, will, when

secluded from light, air and oxygen, continue half a century or more, while the fire, or time, which deepens the first color, will dissipate the latter altogether. There have been works of art in which the white of lead has retained its freshness for ages in a pure atmosphere, and yet it has changed to blackness after a few days' exposure to foul air. Of course a very large allowance should be made for the varnish that is placed on these colors, and also for the various vehicles employed.

TRADITION AND METHOD IN ORNAMENT

An Englishman, down on sham and pretense, spoke thus before a society of painters:

When I say that this or that is good, or right, how do I pretend to know? Well, most questions are settled by custom, by what in art we call tradition. We cannot say what is absolutely and ideally best in any of the arts, in clothing ourselves, for instance, or cooking, almost everything is settled by custom. Therefore it is that no attempts at decoration can be successful while they seem too efforty and strange. Our problem is slowly to add to our scope by experiment, and, at the same time, to resume as far as possible traditions of the past which have been neglected and forgotten. In this field of traditional art, training schools and the trade journals might find scope for most useful activities. I would recommend especially the gathering up and recording of any decorative methods which still are carried on in any branches of the craft. I sometimes see japanned metal boxes finished black, or nearly so, with dabs of red laid at close intervals all over the surface. This is an admirable treatment and the doing is so skillful that there is no call for the superior smile which mention of it is likely to call up. Each red dab is just one brush mark and this is a point to which I shall return. When I was young, and it may be so still, the big scales in shops were decorated in a masterly way with brush-stroke patterns, gold or red on black. The expert country wagon builder still holds excellent traditions of the use of colors and certain methods of decoration by lines, spotting, and picking out of notches. I have just seen such a wagon built at Melksham, in Wiltshire, which must, I think, be an example of the finest unconscious art now being produced.

INSCRIPTION WRITING

A lecturer before a society of decorators thus delivered himself:

I suppose that the writing of inscriptions is a special craft. Certainly all the terrible splendors and complications of blocked and perspective letters which seem to be called for by commercial purposes may well require all the energies of a specialist. I feel, however, that every painter-decorator should be able to write ordinary inscriptions, and, further, that such inscriptions might be made a very proper and interesting factor in decorative schemes. The Germans, who have maintained old decorative traditions longer than other people, make, perhaps, extravagant use of mottos and other writings in rather unreadable black letter. I would recommend a fine Roman character as the standard. Any painter who can control his brush should be able to acquire this in a week. If labels are required on which to write inscriptions they should be drawn from strips of paper rolled up, bent over, and disposed as wanted. Don't attempt to "make up" such labels without such models, they insist on looking like the worst Christmas card efforts if you do. It is usually desirable to make the initial letter bigger than the rest of the word or words written in caps. As a rule the lettering should cover over the whole strip or panel on which it is placed, in a plaint, straightforward way, and the letters should be all of the same kind. Too much effort in spacing, or varieties of type are likely to make the thing vulgar, like an auctioneer's bill.

PUBLIC CARRIAGE CALLING SYSTEM IN HAMBURG

Consul General Robert P. Skinner, Hamburg, writes that within the last year there has been put into operation in Hamburg an automatic system of calling public motors which seems to be giving general satisfaction. Thus far Hamburg is the only city in the world in which the system is in use.

Automatic machines, resembling externally letter boxes, have been placed at every vehicle stand in the city, and these machines are connected with a central office by an individual wire. Anyone who desires to call a carriage and who finds none at the stand places a 1 mark piece ($0.238) in the machine, whereupon his presence is indicated immediately at the central office, and the central office being already advised of the number and location of free vehicles at all other stands, immediately causes a motor to proceed to the waiting customer, who is credited with the 1 mark already paid into the machine when he settles for his fare.

Persons who are in their own homes or places of business and who desire a motor to be sent to them, have only to make known their wishes to the central telephone office with which the cab-calling system is provided and the call is at once transmitted to the nearest cab stand where there are idle vehicles.

When a chauffeur draws up at a stand to await a fare he immediately inserts a slug in the calling machine and thereby notifies the operator at the switchboard in the central office that there is a vacant motor at that point. If there are already a number of idle vehicles on the stand it is unnecessary for him to perform this operation. When the last cab leaves the stand the departing chauffeur removes the slug and thus informs the central office of that fact. At the central office there are dials for every automatic machine in the city which enables the operators to perceive at any moment where there are idle vehicles and where the stands are empty. Each calling machine is provided with a loud call horn and a telephone, so that the chauffeur, should he be wanted in another part of the city, can be readily called to the machine and receive his orders.

There are now many more calling machines scattered throughout the city than there were formerly cab stands. It is so easy to move motors from one section of the city to another that the tendency is to concentrate the vehicles at those points where they are most likely to be in great demand and to send them to remote stations only when a call is received. Each motor thus becomes more effective, as formerly cabs on the subruban stands often waited a long time before obtaining a fare, whereas very likely in the center of the city there were fares waiting for cabs.

The system described is the invention of a German engineer named Drost, and is known in Germany as the autoruf system.

SOME HERCULES BUGGY COMPANY FIGURES

The Hercules Buggy Co., Evansville, Ind., is just finishing a three-story brick addition, giving it 15 per cent. more floor space and making quarters for 200 additional employes. The addition is costing $30,000. The front is of dark brick. The interior of heavy mill construction. The offices of the Hercules companies will be on the second floor of the new structure. The first and third floors will be used for manufacturing buggies. The new addition joins at its rear onto the three-story spring wagon factory which in turn is joined to the main factory by an elevated roadway passing over the paint factory.

The addition of 200 more employes to the Hercules buggy factory this year will give the buggy company a total of 1,500 employes. This figure does not include the 600 employes of the Hercules Gas Engine factory.

During the year just ended the Hercules Buggy Co. turned out 85,000 buggies and spring wagons which went to all parts of the two American continents. A few were shipped to the Orient. Many went to South America. The year's output

exceeded that of 1912 by 10,000 vehicles. During the coming year the Hercules Buggy Co. expects to manufacture over 100,000 complete buggies and spring wagons. New models in buggies, traps and carriages are being added to the scores of designs already made.

The output of the company for the year just ended is valued at $5,000,000. The average wage paid to the 1,300 employes during 1913 was $13 a week. The payroll for the year amounted to over $875,000. For 1914 the payroll of the buggy company alone will run over $1,000,000.

In May of 1913 the company turned out an average of 341 complete vehicles a day. For the coming year an average of 350 buggies for each working day will be maintained.

BROADEN STURTEVANT-LARRABEE CO. CHARTER

The stockholders of the Sturtevant-Larrabee Co., Binghamton, N. Y., at the annual meeting recently, voted in favor of altering the company charter so that the firm can engage in the manufacture of furniture, commercial vehicle bodies and other lines of goods to be decided upon later.

Several sample bodies for motor driven trucks and delivery wagons have been turned out at the plant for demonstration purposes, and these have met with the approval of prospective buyers.

The firm is encouraged with the outlook for good business in this line and is planning upon increasing its facilities for a large output of car bodies and furniture.

The concern has orders on the books which call for the manufacture of double the number of wagons turned out last year. The prospects are bright for the plant being operated on full time with greatly increased working forces during the present year.

The stockholders met January 5 and elected as directors for the year: H. C. Larrabee, A. C. Crossley, I. T. Deyo, F. H. Haskins and W. W. Hemingway. These directors held a later meeting and elected officers as follows: President, H. C. Larrabee; vice-president, A. C. Crossley; secretary, I. T. Deyo, and treasurer, F. H. Haskins.

NEW MOTOR CAR COMPANY FOR CONNERSVILLE

The Lexington-Howard Co., of Connersville, Ind., has just been incorporated at Connersville by E. W. Ansted, J. E. Huston, F. I. Barrows, G. W. Ansted and Emery Huston.

This new company is the purchaser of the good will and trade name of the Lexington Motor Car Co., incorporated in 1908, and of the good will and trade name of the Howard Motor Car Co., and is the direct successor of the Central Car Co.

The Lexington-Howard Co. is incorporated for $150,000.

E. W. Ansted has been elected president; J. E. Huston, vice-president; F. I. Barrows, secretary-treasurer; F. B. Ansted, general sales manager; J. C. Moore, chief engineer, and Emery Huston, advertising manager.

Two distinct lines of cars will be offered to the trade, viz., a four-cylinder line called "Lexington," and a six-cylinder line called "Howard."

The Lexington-Howard company's minimum will be 500 cars per annum.

CARRIAGE WOODSTOCK COMPANY'S ADDITION

The plant of the Carriage Woodstock Co., Evansville, Ind., manufacturing gearwood bows and wood wool, was built and put in operation in 1913 and will build a large extension early this spring. Guild C. Foster is the head of the concern.

The plant of the company cost $25,000 to build and equip, It is of brick, with a big power plant. At present 40 men are employed. The plant stands at the intersection of Franklin street and the C. & E. I. railroad, near the Hercules Buggy Works.

The addition to go up this spring will be 60 feet long by 75 feet wide. Equipped with machinery, it will cost not less than $5,000. The company is shipping over 12 states and has so much business that the employes are working overtime on an average of about 2½ hours a day.

FEDERAL RUBBER MFG. CO. NEW BOSTON BRANCH

The Federal Rubber Mfg. Co., Milwaukee, Wis., announces that it has opened its New England branch, formerly located at 261 Dartmouth street, Boston, Mass., at new headquarters, 173 Massachusetts avenue, in the same city, where the company has provided more commodious show rooms, stock rooms, increased shipping facilities, etc.

In the new headquarters will be found, at all times, a complete stock of Federal automobile and motor cycle casings, bicycle tires, inner tubes, tire accessories, repair materials, rubber vehicle tires, horse shoe pads and other standard goods made by this concern.

The managers of the New England branch are Chase Langmaid and Guy D. Niles.

FIVE CENTS ON DOLLAR

Clarence B. Wilson, receiver of the Ohio Valley Buggy Mfg. Co., of Aurora, Ind., sold the plant at bankrupt sale to Joseph H. Hoskins, president of the Wymony Cooperage Mfg. Co., for $3,000. Mr. Hoskins will remodel the plant and put it in operation as soon as possible.

The Ohio Valley Buggy Mfg. Co. was organized ten years ago by Messrs. Robert E. Frederick, Joseph E. Frederick, Milton J. Hill, John Herron, Jr., and George A. Herron, of Cincinnati, O., with a paid-up capital stock of $50,000. The creditors will probably receive five cents on the dollar for their accounts.

MR. DEMAREST LEFT $230,439

Aaron T. Demarest, head of A. T. Demarest & Co., New York, who died July 13, 1908, left a net estate of $230,439, according to a transfer tax appraisal filed January 2. Mrs. Annie E. Whittemore, daughter; Warren G. Demarest and John H. Demarest, sons, each received $75,816, and an annuity of $500 is left to Mrs. Maria Jane Smith, a sister.

The entire stock of the company is divided among his three children, the will specifying that Warren G. Demarest succeed to the presidency of the organization at a salary of $5,000 in addition to his holdings.

JOHN D. COGAN EMBARKS IN BUSINESS

John D. Cogan, until recently superintendent of the Jandorf Automobile Co., New York, has leased the property at 214 and 216 West Sixty-fifth street, where he will carry on a general automobile business and build automobile bodies for all chassis. There will also be a used car department and tire department. Prior to his connection with the Jandorf Company, Mr. Cogan was with the firm of Rothschild & Co., New York City.

COMPANY NOT BANKRUPT

The petition of creditors for involuntary bankruptcy against the A. D. Thomson Carriage Co., of St. Paul, Minn., was denied December 10 by Judge Willard in U. S. district court. The evidence did not show the concern to be in a bankrupt condition.

Smith Shop

SOME POINTS ABOUT THE SMITH SHOP

In former communications I have pointed out the everlasting nuisance of smoke in the shops, writes Mr. Smallwood. I have talked about the curse of make-shift forges which have come in vogue ever since the iron forge came on the market. Previous to that time all forges were of brick and stone, with large chimneys; and what a comfort it was to work and keep one's clothes clean.

A smith can do more work on a forge and do better welding when the smoke and gases leave his fire in a hurry up the chimney. When the smoke refuses to go up the chimney, it mingles with the white fire and spoils your heat. Besides this evil, inhaling the smoke and gas is constantly undermining the worker's health.

I was talking to a medical student some time ago, and he informed me that he had been dissecting a cadaver who had died from the above cause; his lungs were black from coal dust and a particle of coal was removed from the lung that burned when a match was touched to it.

Another thing: smoke from the smith shop ruins painting and causes damage to new work. Most all the large shops are putting in suction fans, and smoke and dust are carried through large pipes to the smoke stack. This is only in a few shops; the small ones don't care, as they have got used to the smoke and dust. The expense would be very small; if the flue is too small, run a 12-inch pipe through to the roof.

Manufacturers who are planning a new building should call the architect's attention to the flues in the smith shop, which should not be less than 12 x 12 inches inside and run nearly to the floor. In building a forge one thing must be remembered; if the inlet is too large and admits more cold air than hot, the cold air traveling upwards on top of the hot air forces it back into the shop. The opening in the hood should be smaller so that space would always be warm and force out the cold air so as to heat it before going up the flue.

One other important point in laying out the space for the forge is to allow enough room for the smith and his helper to work. There should be two vises for each fire; one vise should be near the anvil so the smith would not lose so much time walking to the vise for bending and upsetting his irons. The forge should be placed between two windows, one to throw light on the anvil, and the other for the finisher's bench. The anvil should not be so close as some shops have them, as in cutting off long bars of iron and welding the same, room is most essential.

WELDING AUTOMOBILE SPRINGS

Having handled a large amount of this work, I will endeavor to explain some points regarding the work, as I have tried welding automobile springs in every way that was ever used for welding iron or steel, says A. H. Brown, in The American Blacksmith.

During the past five years I have welded nearly 2,000 automobile spring leaves, using different methods and preparing my welds in all the different ways known to the trade. I have concluded after all the experimenting, that the old lap weld gives the best satisfaction from all points of view because it is the quickest, cheapest, and is as durable, neat and as permanent as any, and I find that I can get my heat better with this method than with others, and I will explain some of the reasons why I have discarded the other methods:

First—I find that in using a split weld, such as are used on tires, the center does not weld as solidly as it does in the softer metal, and consequently it leaves a weakness.

Second—I find that in using a lap weld, and riveting the parts to hold them in place, very frequently the rivet does not weld except on the surface, therefore causing a cold shut in the center of the weld. Then you have a good start for a new break in the center of the weld, and when the break occurs Mr. Auto Owner says things that Mr. Webster never heard of when he prepared his dictionary.

Therefore, the split weld used and conceded to be the best on edge tools, tool-steels and shafting takes too much time to prepare, and although it works well it is no better than the common lap weld.

Now I will tell you how I weld my springs: I place both pieces edgewise on a piece of sheet iron and mark the curve or set of the leaf with a pencil. Then I have a pattern to set it by when finished. Then I heat my pieces and upset the ends and scarf them as in any lap weld, making the end of my scarf quite thin, as it hammers in easier when thin. Then I proceed to take my welding heat, using my welding compound, and when ready my helper takes one piece and I the other and I catch the edge of both scarfs with the pene of the hammer with light, quick blows. Then my helper comes in with his sledge, and we work the weld down to size. I generally take a second heat as it works down easier and gives a chance to get the scarfs worked in smoother than by doing it all with one heat. I also think that hammering spring steel too cold has a tendency to jar it apart. After the weld is worked down, I set my leaf from the pattern previously marked out and let it cool. I never straighten a leaf more than is necessary to work it properly on the anvil because it saves time in resetting it.

I use Boraxette for welding, but have used plain borax and also Climax Compound with equal success. But I think those things are merely a matter of practice and getting accustomed to them. The success in welding springs is mostly in proper heating and careful working.

I think the brothers should be interested in this profitable work. I am rarely over 20 minutes welding a leaf from start to finish, and charge from 35 cents to 50 cents a leaf. I have even received larger fees on special cases of the kind, but if a man is going to take the spring from under the car himself, it is policy to charge by the hour.

INCREASING THE NUMBER OF CYLINDERS

The single, two, and three cylinder engines may, so far as the standard touring car is concerned, be said to have passed away. Today no one thinks of anything less than a four-cylinder, though some aspire to sixes and eights. It has taken a long time to establish the four-cylinder, yet the effort to do so has been well worth the time and trouble devoted to it. The four-cylinder is a wonderfully efficient engine.

A well designed four-cylinder of the latest monobloc type is not appreciably a larger engine than an old type two-cylinder of considerably less power, and this economy of space is certainly not the least of the features which have made for the success of the four-cylinder. If we consider this engine solely from the point of view of simple construction it must be granted that it represents the practical ideal as compared with every other design working upon the same primary principles.

The point at issue is whether a general increase in the num-

ber of cylinders is probable or desirable. Indications are not wanting that the merits of sixes, eights, and quite possibly twelves will be exploited in the immediate future. So far as the engine manufacturer is concerned, it is the four that they would prefer to make, for the simple reason that it lends itself to such workshop processes as make for accuracy and rapidity of construction. One might instance the crankshaft with its four throws all in the same plane and compare the machining of this with the six cylinder crank shaft. Again, take the case of the single block of four cylinders as compared with the two or three sets of the "six." It cannot be questioned that the advantage in construction is with the "four," and this is made plain in the relative cost of a four and six cylinder. We do, in fact, today get quite well made, though not necessarily highly finished, fours at the price of a high class single of, say, six years ago. On the other hand, the "six" is only found on the most costly cars, although there are one or two of what might fairly be called moderately priced "sixes," but, taking the "six" as a type, it is a distinctly expensive engine, and it is not clear how, even were its advantages much more marked than they are, it is to compete with the four.

True, there is something in the practically perfect balance, evenness of torque and rapid acceleration of the six, but to the vast majority of car users would these advantages be noticeable as against the four? It is not proposed to enter at all into the merits of sixes, eights and twelves, but the object is rather to obtain some expression of opinion as to whether the "four" has not shown itself to be, when all factors are considered, the limit of the number of cylinders desirable. It was never in doubt from the earliest days that the singles, twos, and threes would be supplemented, but although theoretically it would be possible to go on adding as many cylinders as a chassis could be made to accommodate there is obviously an economic limit, and it is contended that this is obtained in the "four."

FOUR-CYLINDER PUMPS IN BELLEM MOTOR WHICH RENDER STARTING FROM COLD WITH KEROSENE POSSIBLE

In the Bellem & Bregeras light and high-speed kerosene and heavy-oil motor which can be started by turning of the crank and without preheating or priming with gasoline the pump mechanism for injecting the fuel takes the place of a carburetor, and it is this feature which mainly distinguishes the motor from standard automobile motors and at the same time renders operation with heavy fuels practicable. The other features of special interest are the pulverizer valve which is automatic and admits a small amount of air with the fuel at the beginning of the induction stroke and the timing of the admission valve, which is arranged not to open until the piston is close to low center and then to admit the air with a rush.

The pump mechanism comprises one pump for each cylinder and is here shown in transverse and longitudinal sections as used for a four-cylinder motor. The piston 1 which is operated by eccentric or cam is prolongated into a stem 2 which is the plunger operating in the pump cylinder 3 with stuffing box 4, and the latter is lined with compressed cork shavings 5, which substance has been found to resist wear very well. The end of the pump cylinder is conical and abuts against a conical seat 6. A check valve is represented at 7. The guide 8 of the upper piston 1 can be moved up and down by means of the pinion 9 which is controlled by hand or by a governor.

When the pump cylinder rests on its conical seat 6 and the guide 8 is at the bottom of its range of adjustment there is a play of about 1 millimeter between the guide and the stuffing box 4. In the cylindrical space 6 there is maintained a constant level of feul-fluid by the method usually employed for this purpose, the kerosene being piped from a single float chamber.

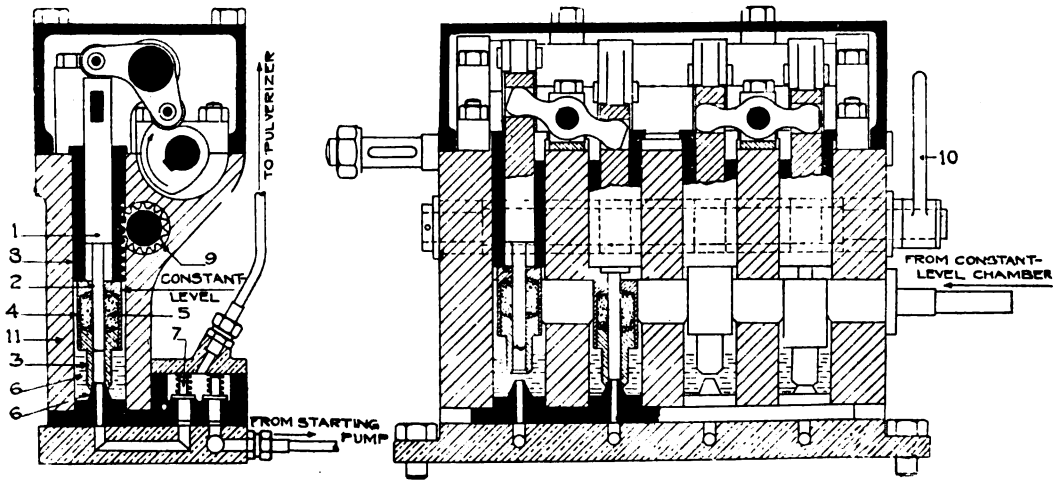
When the plunger 2 is at the bottom of its stroke and moves upward, the pressure and adhesion of the cork between the plunger and stuffing box first of all takes the pump cylinder along until it abuts against the lower end of the guide 8. Fuel is thereby admitted at the lower end of the pump cylinder which is raised from its conical seat, and the rest of the piston stroke serves to fill the cylinder up to the end of the plunger. At the downstroke the conical joint is again closed and the fuel is driven out into the channel leading to the pulverizer valve.

If the guide 8 is raised until the play between the stuffing box and the guide becomes equal to the stroke of the piston, the pump cylinder is evidently only moved up and down with the piston and there is no action to drive the fuel in or out. In the intermediate positions of the guide the amounts of fuel driven into the pulverizer valve are correspondingly reduced. The fuel charges sent to the motor can thus be regulated to a nicety.

The four pinions which regulate the position of the guides in a four-cylinder motor are all controlled by the handle 10, and connected with this is the regulation of the air.

SELLS AFTER FORTY YEARS

Paul A. Koletzke has purchased the carriage manufacturing business conducted in Wallington, Conn., by Luther B. Scranton for the past 40 years. For 19 years Mr. Koletzke has been associated with Mr. Scranton, and for the past ten years has conducted the painting department connected with the business. The two men have also exchanged homes.



Transverse and longitudinal sections of kerosene pump for the four-cylinder Bellem motor

Wood-Working Shop

USES OF MAPLE FOR VEHICLES

Sugar maple is very strong, but its tendency to break by sudden jolt or jar places it at a disadvantage in some parts of certain kinds of vehicles, yet it has a wide range of uses in which it gives satisfactory service. It is maintained by some that tapping trees in the process of sugar making weakens the wood by the introduction of incipient decay; but as far as the commercial use of the wood is concerned the matter is not important, for a very small per cent. of the maple lumber on the market is from tapped trees. Wagon axles of sugar maple are considered by some as good as any. The heaviest two-wheel log trucks used in Michigan have axles of this wood 8 inches square, with wheels 10 feet high. Such an axle sometimes carries 20,000 pounds over rough log roads. Maple is employed for wagon beds, though its weight is against it, as frames for buggies, dashboards for carriages and light business wagons, and its use for buggy shafts has been reported in Kentucky. It is widely employed in the manufacture of small vehicles, as baby buggies, go-carts, and children's wagons. It is good sled material and is one of the common woods in cutter and light-sleigh manufacture, entering into practically all parts of the vehicles, but is particularly liked for the soles of heavy sleds. Its hardness and smoothness insure easy running and long service. Sugar maple is recommended for handles and other parts of go-carts and for baby carriages, which are to be finished in white enamel. The wheelbarrow manufacturer, in certain localities, employs scarcely any other wood, while in other places the handles are of sugar maple and the body of white elm or some other tough wood.

Car builders make use of maple for many purposes and in cars of many kinds. Its white color gives it a value as finish for the interiors of electric cars, and occasionally for steam coaches and Pullmans. Service of a different kind is found for it in log cars, where it goes into frames and bunkers. Platforms of push cars and trucks employed about factories and railroad stations are frequently of sugar maple, as are the frames of railroad velocipedes.

An important demand comes from manufacturers of bicycle rims, and this rather small commodity requires several million feet annually of select maple.

The rapid rise to importance of automobile manufacture has created a new demand for sugar maple, largely for benches, bottoms, subfloors, and frames.

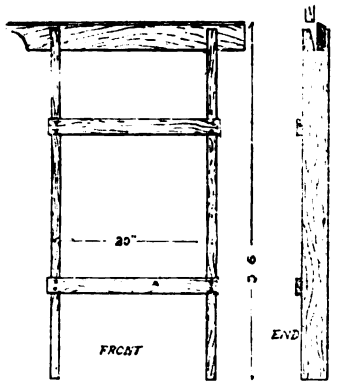
BIRCHWOOD

While Boston was staining birch and selling it as mahogany in furniture and musical instruments, New York carriage makers were buliding fine panels of it and finding ready sale for their product without hiding it under false names. There was more temptation from a money point of view a hundred or more years ago to substitute birch for mahogany than there is now. Mahogany was about as expensive in this country then as it is at present, while birch was not half as costly as now.

In its importance as a vehicle wood, sweet birch ranks much below the hickories and some of the oaks, but it fills a number of places. It is well suited for panels, sometimes solid and sometimes of built-up veneers, which find place in fine carriage and automobile bodies. Passenger and sleeping car builders also use birch for paneling. Automobile manufacturers have found several places for sweet birch. It goes into seat frames, floors, filler boards, dashboards, tops, dashboard frames, and steering wheels. It fills some of these places because it is strong and stiff; others because it is handsome. In either case only the highest grade is employed. Some sweet birch is made into hubs, but it is not in the same class as elm and oak for this purpose. It is sometimes seen in the hubs of light carts and buggies. For children's sleds and wagons birch is one of the available woods.

SAW HOLDER

We give particulars below of a device for holding a hand saw firm while it is sharpened. One advantage is that it is simple and easy to make and has no screws or thumb nuts to tighten up when fixing the saw. The saw is held firmly in position by one of the jaws, which drops in, and it has a piece cut out on the taper, so that it has only to be pushed down to hold the saw securely. The two uprights are got out about



3 x 1, and the two jaws 2½ x 1. The stand is about 3 ft. 6 in. high by 27 in. long, so as to take the full length of the saw blade. The frame is held together by two or more cross battens fitted in and screwed to keep it square and firm. One jaw is a fixture, and is screwed to the top of the legs; the other jaw is loose, but fits in on the taper, so that as it drops down it gets tighter but at the same time keeps square with the fixed one. The saw is placed in position and the loose jaw tapped down till all is firm.

If you have a poor light at your bench you can take this stand outside or anywhere it suits you and lean it against a post. If it was fitted with a pair of legs, so that it could be used after the style of a pair of steps, it could be made to stand up anywhere, and for anyone working at an outdoor occupation this would be a great advantage.

THE WHEELBARROW IN CHINA

The wheelbarrow is the most common medium of transportation in Shantung. The load is balanced about the wheel so that the workman does not have to carry a portion of the load as is the case with the American wheelbarrow. Some wheelbarrows have but one push man; some have a pulling man as well; some have one, two, and three donkeys to aid in the pulling; and some are equipped with a sail to obtain the help of favorable winds. The equipment depends upon the load carried, the maximum load being about a ton. Transportation by wheelbarrow is from five to eight times as expensive as transportation by rail in this province. Thus, the native meth-

ods of land transportation, even with labor receiving a wage of less than 10 cents gold a day, are costly, disproportionately so as compared with the prices of other commodities. Yet Shantung has tens of thousands of wheelbarrows engaged in traffic. It is easy to appreciate what railroads will mean to the development of this densely populated province.

ENCOURAGING TO TIMBER USERS

More than 2 billion board feet of timber, with a value of 4½ million dollars on the stump, was sold by the forest service last year, according to the annual report of Henry S. Graves, forester. This is an increase of 167 per cent. over the sales of the preceding year. The timber sold was largely for future cutting under contracts that will run for a number of years. The actual cut was a little less than 500 million board feet, an increase of 15 per cent. over 1912. Still larger sales are in prospect.

REDUCING FOREST FIRES

With the middle of September the fire season on the national forests came practically to an end and with less damage than ever recorded. There is always some danger from carelessness of campers or of settlers burning brush and clearing land, but the real danger season extends only from the middle of June until the middle of September.

The effectiveness of the organization is shown particularly by the fact that while there were in all approximately 2,260 fires, as against 2,470 last year, yet the area burned so far this year is only about 60,000 acres as against 230,000 acres in 1912, and 780,000 in 1911.

MAKING MOTOR CUSHIONS

Make two frames, making a pattern on a sheet of cardboard, ½ in. narrower each side and 1¼ in. narrower at back than line marked, for tacking in bottom of squab. Cover both the frames with hessian. One thickness is enough for bottom, but put two on the top; or you can work in odd pieces of canvas, by sewing together. On the bottom frame place a piece of cardboard the same size, and sew at each end and middle to keep it in place. On this sew your springs. It will take three rows for a front cushion, and four in the back. The number of springs must be left to the judgment of the trimmer and the gauge of springs used. For front row use 5 in.; second row, 4 in.; and back row, 3 in. This gives a nice slope, and is more comfortable than a straight one. Now lay top frame on springs and get it square in front and sides with bottom frame, keeping in position by driving long awls through both into bench. Then sew the springs to top with strong twine. Tie down to 5 in. at front and 3 in. at back, and the top of frame, if kept square in front, will have a slight bevel at the back; in fact, some have the top frame made smaller. For a small cushion, mark roll 4½ in:; large cushion, 5 in.; and for a 4½ in. cushion, mark 4½ in. from front edge of frame for your calico; then another ⅜ of an inch nearer front of frame as a line to sew your roll to the frame. Now sew on your calico and bridle enough hair on back of cushion to suit taste. Pull calico over and sew around frame.

In cutting your leather stretch it tight along the line ⅜ in. from calico; then stretch over the calico, holding it in place with upholsterers' pins. Mark off exact and allow ⅜ in. for sewing. Cut a piece of leather 1⅛ in. wide, long enough to go across cushion, for your piping between roll and back. For roll cut leather 7¼ in. wide and 3 in. longer each side than cushion. This gives you a roll with 2 in. fullness, viz., 4½ in. width of roll, 2 in. fullness, ⅜ in. each side for sewing. Now baste your roll piping and back together and sew up on machine with strong thread. Tear off a strip of calico 7¼ in. wide and sew this on at the same time on the inside of leather for roll. Cut your front border 7½ in. wide and long enough to come around the corners four or five inches; or you can join at the corners, the same as buggy cushion, but it looks neater to join at the side. Now fit your back border. This can be made up of scraps and sewn together. At the same time put in five eyelets, three at back and one each side, as airholes.

When fitting your leather it is advisable to put marks in the center of front and back, so that you can fit back the same. Now baste borders on to top, leaving the ends of roll open, and sew up on machine. Place a layer of wadding on back and roll; it will make a smoother job and hide any irregularities in the stuffing. Strain across the cushion at the piping, holding with pins, and then sew down the back, getting your marks exact. Next stuff up your calico roll the required height and pull over your leather and sew down to frame. Pleat your ends inside your pipping and sew to the frame, then put a blind stitch through piping. Turn cushion over. Stuff up your front border and a little round the sides. Sew to bottom with twine, then put a layer of wadding and blind sew your bottom on of black linen or duck and your cushion is complete.—Australasian Coachbuilder.

ODDS AND ENDS

Havoline as a name does not infringe Valvoline as a name of lubricators, according to a court decision.

Peerless motor car management is discontinuing agencies because of "readjusting the proportion between selling and manufacturing expenses, the selling expenses generally in the high grade motor car business having been found too high."

The receiver for the Nyberg Auto Co. turns $503.51 over to the trustee in bankruptcy, but wants $600 for two months salary as receiver. Problem.

The Pope Mfg. Co. enjoys the luxury of three receivers.

The newest thing is the electric brake. It is a really new development.

In the Moline-Knight test of 336 hours run, a curious fact has been noted. The power changes with the barometer. One hour readings were taken, and the power curve agrees exactly with the barometer curve.

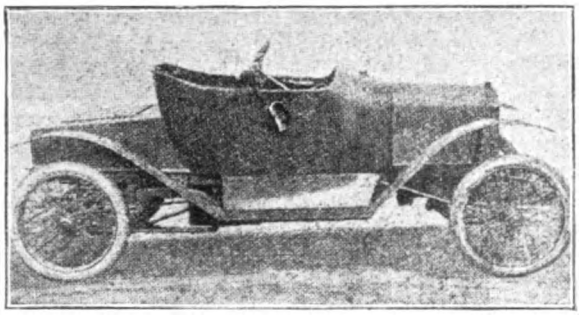
The application of a new tariff always causes at first a little confusion until its provisions are in working order and the right classification established. For some time to come the decisions of the inevitable disputes between importers and the government officials will form a series of precedents, of value in future cases. When the present German tariff was inaugurated, a supplementary hand book giving the different classifications was issued for the guidance alike of government officials and importers. Such a compendium will doubtless in time be issued here, as the provisions of the tariff in many cases require interpretation, and the gradual experience to be gathered by those interested in the operation of the tariff will prove a valuable guide in cases of difference of opinion as to the classification of imported products entering into competition with those of American manufacturers.

REORGANIZE WORKING FORCE

After closing down for ten days to reorganize its factory force, the Kentucky Wagon Mfg. Co. reopened January 5. There has been no reduction in the force of workmen, but President R. V. Board states that a number of foremen have been changed. A reorganization of the sales force is expected to become effective about February 1.

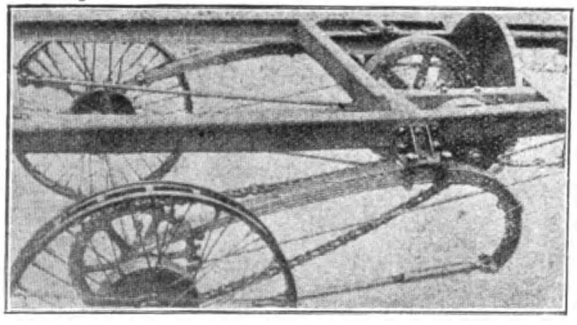
THE AJAX TO BE PRODUCED ABROAD ON A BIG SCALE, AT $390

A low priced four-cylinder miniature car will shortly be placed upon the foreign market by a company under American business management. The machines will be manufactured in France, and plans have been completed for their production on a huge scale. At the head of the concern is Benjamin



Briscoe, for a long time connected with the Maxwell-Briscoe car. At the last motorcycle and cyclecar show at Olympia, Mr. Briscoe realized the importance of the cyclecar movement, and with true American energy set to work to design a machine which could be produced and sold by the thousand.

The design incorporates a simple friction drive. The cylin-



Ajax Suspension

ders and the upper part of the crank chamber are a single casting, and the cylinder head is detachable. Cooling is by thermo-siphon and lubrication is by a plunger pump forcing oil through two sight feeds on the dash to troughs under the big ends and to the bearings. Ignition is by a Briscoe high tension magneto, and to the rear of this is the oil filler for the sump in which the oil is carried.

The engine, which will turn at 2,500 r.p.m., is attached to the frame at three points. On the flywheel is mounted a flexible coupling consisting of a metal ring, and a long shaft carries a steel friction disc at its rear end. The driving disc, faced with compressed paper, is mounted on a castellated countershaft pressed against the driving disc by a strong spring. The thrust of the rear wheels also assists in producing pressure between the discs. The final drive is by a roller chain to a solid back axle.

Steering is by worm and sector, and two separate sets of brakes are fitted. The channel steel frame is sprung at the rear by a special cantilever type of spring, the distinguishing feature of which is a front scroll receiving the forward end of the adjustable radius rods. A copper tube radiator of special design is employed, through which the water has to follow a zig-zag course from the top to the bottom.

A two-seater body is provided with a roomy locker at the rear. Detachable wire wheels are fitted as standard.

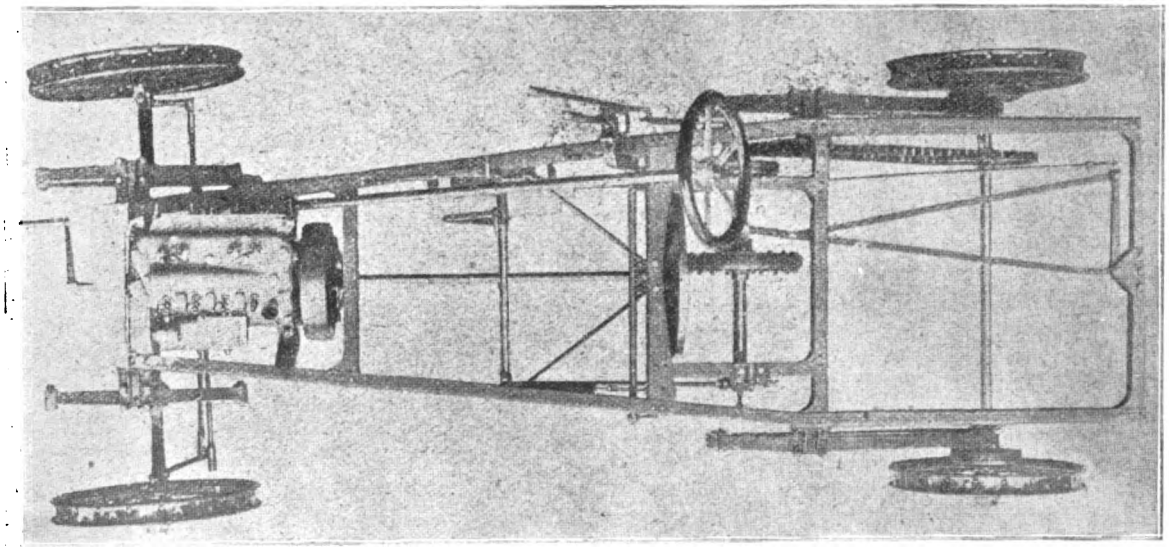
The wheel base is 7 ft. 6 in. and the track 3 ft. 7 in., with a total weight of about 800 lbs. The Ajax models have been on the road for the past four or five months, and have been thoroughly tested before being offered to the public.

WAGON FACTORY WILL GO IT ALONE

The firm of J. C. & S. L. Spach, which has conducted a flouring mill and wagon factory at Winston, N. C., has divided its interests. The wagon branch will hereafter be known as the J. C. Spach Wagon Works. Mr. J. C. Spach will be general manager, Mr. William M. Spach will be in charge of the office, and Mr. Charles L. Creech will be in charge of sales and credits. Mr. William M. Spach represents the third generation of the Spach family engaged in the manufacture of the J. C. Spach wagon. Mr. S. L. Spach will be the proprietor of the flouring mill.

FLINT VARNISH WORKS REORGANIZE

The Flint Varnish Works have been completely reorganized, and the capitalization increased to $1,000,000. W. W. Mountain has been elected president, and will also continue to act as general manager. The remaining officers are: R. R. Scott, vice-president; H. F. Keen, secretary; A. H. Goss, treasurer. C. W. Nash, J. Dallas Dort and W. W. Mountain, of Flint; R. R. Scott, of Toledo, and Arnold H. Goss, of Detroit, are the directors.



The Ajax Chassis

SCIENCE AND THE CAR

It is particularly interesting to note to what an extent the equipment of the modern car is indebted to experimental science as practiced many years ago. The origin of many of the devices which, today, are adding so much to the comfort and convenience of the car owner, can be traced back a great many years to the apparatus used in the lecture room and the laboratory. Although we do not use the coil much nowadays in ignition, other than in connection with dual systems, it is worth referring to as one of the classical pieces of electrical apparatus that used to delight the popular science audiences half a century ago at such places as the old Polytechnic and the Royal Institution. It appears to have been invented by Rhumkorff about 1845. The magneto machine, with the exception of the high tension parts, such as the distributor, was also exhibited as a great scientific novelty quite 50 years ago, and was used for giving shocks. Take the example of that very up-to-date device, the speedometer. Apparatus embodying the principle of the centrifugal governor was used in the laboratory nearly a century ago. The magnetic speedometer is based on one of the classical experiments in electro-magnetism, viz., the rotation of a magnet under a copper disc, which causes the disc to rotate. The experiment will be found described in the oldest text books on physics.

A great deal of ingenuity has been displayed in inventing warning devices, such as electric horns, mechanical sirens, organ pipe arrangements. Yet practically all these had their counterpart in the lecture room and laboratory, as the old fashioned text books on sound will prove. The electric "buzzer" remained a scientific toy for a great many years, and then someone introduced it as a substitute for the electric bell. Today we see the same scientific toy glorified into numerous varities of warning devices under numerous names.

When we come to consider lighting, says Motor, we find that the possibilities of acetylene were often demonstrated in the lecture room; but it was not until Moissan in 1892 discovered the method of making carbide of calcium in a cheap manner that it became commercially applicable. On the other hand, we find the origin of electric lighting in the experiments of a century ago, when Sir Humphrey Davy produced an arc from a primitive form of battery at the Royal Institution. The dynamo was curiously late in being applied to lighting—somewhere about 1860 seems to have been the time—when an inventor named Wilde produced a dynamo, which is still preserved in the Science Museum at South Kensington.

KEROSENE AND PEROXIDE

George B. Selden is experimenting with a new fuel—or, rather, a fuel treated in a new way. Selden's fuel consists of kerosene treated with peroxide of hydrogen, and the statement is made that the process can be carried out for little more than the bare cost of handling the kerosene.

The experiments are the outcome of Selden's observation, made many years ago, that hydrocarbons of the paraffin series, which include kerosene and gasoline, absorb peroxide of hydrogen in considerable quantities, forming a compound of stability, differing somewhat in color, specific gravity and flash-point from kerosene. When vaporized the oil burns freely and completely in the cylinders, forming no deposit and causing no smoke or smell in the exhaust, and carburetors of ordinary construction can be used, provided they are capable of a wide range of air adjustment, and that heat from the exhaust gases from the motor may be utilized.

One test was made burning peroxidized petroleum distillate in the motor of a 40 horsepower touring car which weighed, with its passengers, 4,600 pounds. A gallon of the fuel carried this car 12.7 miles in 24 minutes without smoke or odor from the exhaust, the machine running on high gear all the time. The muffler was used throughout the test.

Not only is peroxide of hydrogen efficacious in assisting the clean combustion of fuel, but when mixed with lubricating oil it is said to have the virtue of preventing smoke and sooty deposit. Selden states that one of his cars has been run for some 1,500 miles on "peroxidized lubricant" without forming sufficient deposit on the spark plugs to soil a white handkerchief, though it is not stated what fuel was burned. Gasoline and other petroleum products are susceptible of treatment by the peroxide process, as well as kerosene.

When peroxide of hydrogen is decomposed by heat large volumes of oxygen are liberated, the peroxide containing twice as much oxygen as does water. This access of oxygen is responsible for the clean combustion obtained with the compound. Oxygen, which is the principal item in the peroxidizing of fuels, can be produced, it is said, for about $2 per thousand cubic feet, and for this reason the treatment of fuel by the process which Selden has brought into prominence can be carried out at a comparatively trivial expense.

HARDWOOD MANUFACTURERS TO MEET

President W. E. DeLaney, of the Hardwood Manufacturers' Association, has issued a call for the next annual convention of the organization to be held at the Gayoso Hotel, at Memphis, January 21 and 22. The call includes a cordial invitation for consumers of hardwoods to attend.

The meeting will be one of the most important ever held by the association, which is a factor of tremendous importance in the hardwood industry.

CHANGE IN KEYSTONE FORGING CO.

Isaac Cornwell and T. O. Van Alen have secured a controlling interest in the stock of the Keystone Forging Co., Northumberland, Pa. C. G. Van Alen, who has been president of the company since its organization, has sold out his entire interest. At the reorganization meeting held recently, the following officers were elected: Isaac Cornwell, president and general manager; William B. Waples, vice-president; T. O. Van Alen, secretary and treasurer; J. D. Weekes, sales manager. These officers, together with G. Leslie Van Alen and A. J. Cornwall, make up the board of directors.

WILL MAKE WIRE WHEELS

The Standard Welding Co., of Cleveland, which heretofore has devoted its energies to the production of rims for motor-driven vehicles, has taken up the manufacture of wire wheels for automobiles. It will make its early efforts in the wire wheel field at the owners of Ford cars, whom it will supply with complete sets of wire wheels at the low price of $25 per set. The company will also manufacture other wheels of larger types and advanced features.

PARSONS MFG. CO. INCORPORATES

The name of Parsons-DeVlieg & Co., manufacturers of concealed hinges and automobile accessories, Detroit, Mich., has been changed to The Parsons Mfg. Co., and the concern has been incorporated under the laws of Michigan. Increasing business has compelled the company to remove to larger quarters at Twenty-first and Fort streets, where additional equipment just installed will double the former capacity. The sales office is located at 910 Union Trust Building, Detroit.

S. A. E. MEETING

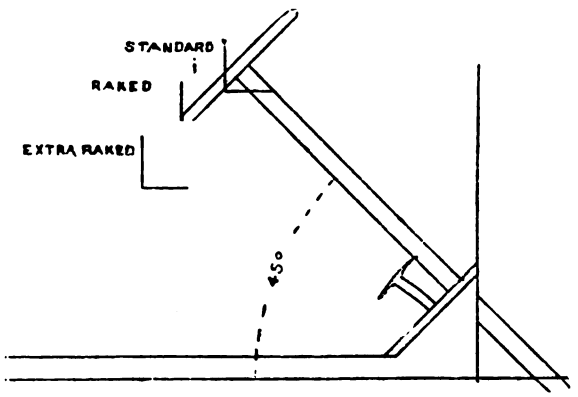
Annual meeting Society Automobile Engineers was held at the Automobile Club, New York, January 4-8. The banquet was held at the Plaza Hotel. The membership is now at the highest notch.

THE DRIVING SEAT

It has been noted that a car, otherwise easy to drive, has a tiring effect upon the driver, and it is thought that this is due in a large measure to the thickness or otherwise of the cushion or the seat. The driving seat of a car should be a comfortable one, and to attain this end there are certain facts to be remembered which do not always receive due attention.

The driver desires to be seated either high, medium or low, and the exact position is regulated by the necessary distance from the pedal, so that, without straining, either of the pedals can be pushed home. In doing this the leg is acting as a toggle joint, and, unless the relative positions of seat and pedal are such as to permit of this mechanical action being done mechanically, the driver will find that he is tired out if he is traveling through a route which necessitates the frequent use of the clutch and brake pedals.

This position being determined by mechanical considerations, the position of the steering wheel, if it were adjustable, would not greatly matter, for the driver could set it at any angle or distance which he found to be most convenient. But this adjustability of the steering wheel has not always been found



The three recognized steering column angles

to be practicable, and, therefore, the finding of the correct position of the seat to suit the driver depends upon the relative positions of the steering wheel and also of the pedal, and a writer in The Motor exploits them.

The correct position of the steering wheel has been the subject of discussion ever since it was adopted, and it would be impossible to say that the position is standardized.

Three positions are indicated in the illustration by the three right angles. There is a difference between the position of the standard and extra raked positions of 8 in. from the dashboard and of 9 in. from the floor of the chassis to the underneath side of the wheel. An examination of a number of blue prints and chassis elevations indicate that an angle of 45 degrees is a common one for a medium rake, and that the distance of the pedal from the dashboard and the chassis frame is as indicated in the sketch, the distance from the pedal to the underneath side of the wheel being generally 24 in.

As the chassis manufacturers decide the angle of the steering wheel as well as its position, it is necessary that the driver should fix upon the exact position of his seat with reference to the angle of the steering wheel, as well as the position of the pedal. It is obvious that, as a man may be considered for certain purposes a mechanical contrivance, he must exercise the mechanical powers in a mechanical manner, and attempt to use the pedals without having a suitable and sufficient support in the cushion and squab of the driving seat is simply to throw work on the muscles of the back which they were never intended to perform and to induce fatigue very rapidly.

The easy movement of the steering wheel depends upon the correct position of the arm of the driver, for if the muscles of the arm and shoulders which are employed to move the wheel are working awkwardly (the word expresses the action but does not explain it), they will tire sooner than if they were working naturally, and the mechanical devices for steering, which may be perfect, will prove difficult of operation, not from any fault of their own, but simply because the driver is seated in the wrong place. This leads to one or two conclusions.

With the great variety of persons to be accommodated on cars it is hardly possible to suit the majority with only a possible alteration of one of three points. The movable pedal appears to be the next best arrangement, and there are a very great number of devices in use for altering the height and length of the pedal to suit different persons. It would appear to be more in accordance with mechanical practice that any alteration to be made should be done at this point, but the matter bristles with difficulties, and they cannot be disposed of by merely setting out the advantages, or otherwise, of some particular course.

The position of the wheel, whether standard raked or extra raked, does not so much matter, provided the correct angle for that position is found. It is, therefore, in the relative position of the pedal and the seat that comfort must be sought, and in both of these cases there are certain mechanical difficulties in the way of obtaining an ideal result. So far as the seat itself can help towards a comfortable drive, common sense would point to a separate seat for use of the driver. A very soft seat and back to the cushion is undesirable. The driving seats of the majority of cars, after a short period of use, show where there is the hardest wear. A driver's seat should be designed more as a perch from which he can exercise power than as a seat upon which he may recline. The position of the seat on the car and in relation to the rest of the passengers is ideal for comfort, and where some intelligence has been shown in settling the position and form for the purpose of driving, a very comfortable seat when in use may easily be designed.

CONSTRUCTION FEATURES IN CARS WHICH CAUSE EXCESSIVE WEAR AND EARLY BLOWOUTS OF TIRES

For a couple of years a car owner in France was confronted with the fact that his front tires regularly gave out—usually blew out—after serving for 700 to 800 miles less than the rear tires, although the situation should have been the reverse. None of the remedies suggested to him by others proved of any avail, though all were tried, until one day he noticed that the front wheels wobbled a little although the wheels and axles were parallel and no play was discoverable in either the tie-rod or the steering gear. The latter was irreversible. It then occurred to him to charge the peculiarity up to the front springs which were very flexible. He had an additional leaf inserted in each of them, in September, 1912, and the mileage made by the front tires which were fitted at about the same time has already exceeded the average of his previous experience by about 2,000 miles, while one of the rear tires has given out. It is now the conviction of this extensive automobile traveler that three reasons—all relating to the construction of his car—were responsible for the excessive wear of the front tires of which he was previously the victim; first, the excessive flexibility of the front springs; secondly, the irreversibility of the steering gear and, thirdly, certain proportions in the relations of the right front spring to the steering rod and the steering arm which aggravated the effects of the two first-mentioned factors. When the flexible spring was compressed and thereby flattened, the axle was pushed back and with it the end of the steering rod, but as the steering gear was irreversible, the steering rod could not really be pushed back except against the strong resistance of the emergency springs contained in it, and the actual result was therefore always a small turn of both front wheels every time the vehicle spring

on the right side of the car was flexed. Though he remedied only one of the three factors at fault—by reducing the flexibility of the spring and thereby the curve described by the axle—the reduction of tire wear was phenomenal.

The same observer holds that any form of rigid push-and-torsion strut, especially of the type which is forked in front, causes a great deal of wear of the rear tires by preventing all lateral displacement between the axle and the chassis. "Follow on the road," says he, "behind a vehicle which runs at a speed of 35 miles per hour or more and you will be astonished to notice, if there is no dust to obscure the vision, how many and larger are the separate movements, now of the chassis and vehicle body and now of the wheels and axle, which take place in all directions. These movements escape the attention of those sitting in the vehicle, as they have no means for observing them directly, but they argue strongly for introducing a flexible element in the lateral relations, as may be done most simply by driving through the springs."

Cooling by the thermo-siphon system, though so much in vogue, must also be responsible for considerable tire wear, in front, since the 15 gallons of water required for a 20 horsepower motor with this system and the extra weight of the radiator strong enough to support this liquid load must make a considerable difference in the load upon the front wheels, as compared with the two gallons which are all that is required if a pump and an efficient radiator are used under otherwise similar condition.

HOW ABOUT RUBBER

Rubber prices have given rather an interesting exhibition during 1913. Reviewing the course of Upriver Fine, we find that in January it ranged from $1.02 to $1.09; in February from 96 cents to $1.03; in March from 88 to 96 cents, and in April from 78 to 89 cents. In other words, there was a distinct downward trend constantly in evidence, the lowest price of one month being practically the highest price of the next. According to India Rubber World, the drop in average prices from January to April was about 22 cents a pound. Now the question is: What were the causes? There are probably several answers to this question. Possibly the increased cost of living, which made it necessary for the great body of consumers to give more careful consideration to their expenditures is one. It needs no proof to show that when the necessaries of life are ranging along the upper altitudes a very considerable proportion of the community has to cut off many luxuries, and many health-preserving articles that should be classed as necessaries.

But there was another cause for this drop which has escaped attention but which probably had as much influence as all other causes put together, and that was the decrease in the consumption of rubber by the Akron mills during a period of six or eight weeks, beginning early in February. The Akron strike affected the mills in varying degrees, some of them being entirely closed and others working on reduced tickets. Immediately following the termination of the strike there were disastrous floods in Ohio, which further affected the operation of some of the mills.

Akron uses about one-half of the crude rubber consumed in the United States, her share being about 25,000 tons a year. February and March would normally be busy months, particularly in the production of tires, and had it not been for the strike and the floods, it is safe to say that the factories of Akron would have consumed close to 6,000 tons of rubber from the middle of February to the middle of April. About 3,000 tons of rubber which under normal conditions would have been consumed during that period remained on the market. This amounts to 6 per cent. of the annual consumption of the country and would be fully 25 per cent. of the rubber that would naturally be converted into goods during that period. This great decrease in demand for rubber would certainly account for the 20 per cent. lower prices in the early part of April as compared with those of four months before.

Immediately after the Akron factories got fully under way rubber prices began to mount. In May the range was from 81 to 92 cents; in June from 87 to 92 cents, and in August as high as 94 cents was paid for Upriver Fine. That is, about one-half of the loss during the four months from January to April inclusive, was made up during the four month from May to August.

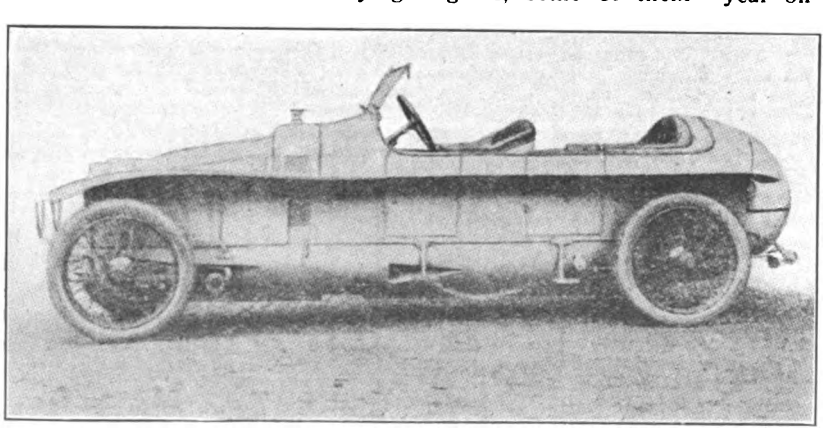
The causes for the low rubber prices of last spring appear, therefore, to have been exceptional and temporary; and while, with the greater production of plantation rubber, prices are bound to tend downward as the years go by, there appears to be nothing in the present situation or in the immediate future to indicate any continuous low level of prices.

A DAILY NEWSPAPER ON RUBBER TIRES

A daily paper, ruminating on rubber matters, makes the interesting statement that the yearly production and consumption of automobile tires in this country has now reached 60,000,000. As there are about 1,000,000 motor cars in commission, it requires no very profound process of mathematics to determine that each car would be consuming, on an average, sixty tires a year. Making a conservative allowance of $25 per tire, it becomes clear that the average car owner must lay aside from his annual income an item of $1,500 to meet the unescapable tire cost. Possibly there are some timid souls that might shrink from the ownership of an auto if compelled each year to part with $1,500 simply to keep it shod.

But let them take heart, for there is another chapter to this mathematical story. The same writer goes on to say that this yearly output of tires is worth $120,000,000. From which it will appear that the value of tires has dropped to $2 each. Now, many a careful car owner who avoids driving over broken bottles and grazing the curb, goes comfortably through the year on a single set of tires—which, at $2 each, brings the auto-shoeing bill down to $8 for the twelve months, or a trifle over two cents a day. Looking at it from this angle, owning an auto is cheaper than staying at home and reading the paper. It all depends on the point of view.

In the meantime, if the statistician of the daily referred to were to revise his figures, placing the annual American consumption of auto tires at six instead of at sixty million, he probably would come appreciably nearer to the facts.—India Rubber World.



Side view of special French body design

Design properly is merely a sufficient knowledge of any given craft and the making of new combinations to fit new occasions. Design is an essential part of all good craftsmanship.

THE MOTOR CAR IN CEYLON—WHERE THE AMERICAN FAILS

Consul Moser tells American builders where they are shy when it is a question of pleasing the Ceylonese. He incidentally tells some plain truths about the shabby finish of the medium price American car, and the figure it cuts in some markets.

It is impossible to give the number of motor vehicles in use in Ceylon, as no complete statistics of such are kept. At the end of June, 1913, there were 1,368 motor cars and motor cycles registered for use in Colombo, but this does not take into account the motor vehicles owned by persons outside of the city. It is probable that tea planters in the Uva, Uda Pussellawa, Kelani Valley, Kandy, and Nuwara Eliya districts own almost as many, and that the total number in the island is not far short of 3,000. If one-third of these are motor cycles, the estimate of 2,000 motor cars of all sorts will probably not be far wrong. Of this number there are perhaps 30 motor trucks and lorries now in use on the island, principally Albions and Lacres of British manufacture.

The United Kingdom supplies many more pleasure cars than all other nations combined. Until 1912 the German cars ranked second in point of popularity and the French third, but in that year and since American cars have held second place, and at present as many American cars are being sold here as French and German cars combined.

The following cars, in the order named, are most popular in Ceylon in their grade: Cars from $2,750 upward—Wolseley-Siddeley, Sunbeam, Austin, Napier, Berliet, Benz, Opel, Lancia, and Fiat; cars from $1,850 to $2,750—Adler, Vulcan, Argyll, Arrol-Johnston, and Swift; cars from $1,000 to $1,850—Ford, Overland, Hupmobile, Maxwell, Studebaker, and Krit.

There is no market for cars of over 20 horsepower, R. A. C. rating. The specifications most desired are 15 horsepower, four cylinders, four speeds, gate change instead of a selective type, Bosch magneto, Zenith carburetor (made in Belgium), five detachable wheel rims, low-lying style, but with a clearance of over eight inches, and streamline torpedo body. As Ceylon is extremely mountainous and all the resorts are located in high altitudes that can be reached only over roads having steep gradients and hairpin curves, cars should be geared to take high hills easily. There is a preference for gravity feed over pressure feed among the planters in the hill districts. Great speed is not demanded in a car as the narrowness and excessive number of curves in the roads will not permit it to be used over any considerable stretch of country. For the same causes the wheel base of cars for this market should not exceed 115 to 120 inches. Tires preferred for 15 to 20 horsepower cars are 815 by 105 millimeters (31.7 by 4 inches) and three times as many of these are sold as of all others.

One great objection to American cars is the fact that their rims are not measured in millimeters. It is believed that if American cars could be built for export with their parts standardized to the most popular sizes of the metric system a very great increase in their sale would be noticed, at least throughout the east. All valves should be of the European patterns and sizes and not American, as motor car agents and houses here have steadily declined to keep American spares. The demand is not sufficient to make it pay. Local agents for American cars have more difficulty over the question of spare parts, both in making sales and in their subsequent efforts to keep their customers satisfied, than over any other detail. Rims should be of 810 millimeters (31.889 inches), allowing for 90 to 105 millimeter (3.54 to 4.13 inch) tires, or should correspond as closely as possible to this size.

All cars intended for sale in India and Ceylon, or the middle east generally, should be built with a special view to the accessibility of engine parts and to simplicity of design and arrangement. This has particular reference to the carburetor and magneto, neither of which are clearly understood by native engineers nor free from abuse on the part of native chauffeurs. Electric lights are appreciated if reliable and not too costly. But unless these are special features the ordinary acetylene generator is preferred for lighting.

All motor cars should be equipped with top, side curtains, wind shields, lamps, etc., and quotations of prices should invariably include these fittings. Strong top and side curtains are necessary on account of the sudden and sometimes violent rain storms. Wood and metals used in the construction of the car must be able to withstand constant humidity and severe heat. Unenameled steel parts, steel hinges, and studs invariably rust, and spoil the car's appearance in a very short time. Cars should have large radiators and be capable of running under high temperatures without overheating.

It is the concensus of opinion among motor car dealers throughout the island that if American manufacturers would make a few small but important changes in the cars they attempt to introduce here a greatly augmented sale would surely result and an important permanent market probably be established for the future. At present a Ceylonese will buy an American car first because of its cheapness, which may alone enable him to own any car at all, and next because of its excellent running qualities, its powerful noiseless engine, and its ability to climb hills. Whenever he can afford it, he invariably throws away the American fittings, hoods and side curtains and orders English ones instead. If possible he has it repainted and changes the nickel trimmings for brass. The Singhalese dislike intensely the black bodies and black hoods, nickel trimmings, and all-metal screens which American low-priced cars now affect. A lugubrious appearance is not in harmony with the tropical sunshine and brilliant colors which his mind has associated with pleasurable things all his life. Nickel peels quickly and rusts easily in this damp climate, and it is also rapidly worn off by the vigorous polishing the native coolies give it, whereas brass is durable, brilliant, and easily taken care of.

The most important objection of all, except perhaps that relating to color, is that the American manufacturer of low-priced cars fails to give them the number of coats of varnish they need to compare favorably with even the most ordinary European car. At a good distance in the street the shrewd native buyer can pick out an American car from its European rivals by its lack of enough coats of varnish to give it the substantial finish; also by its exaggerated lines, and the crudeness of its coach work. These faults do not strike the Singhalese mind as being due so much to economy in construction as to slovenliness of workmanship. No amount of high power, speed, or engine perfection can make up to the Oriental for this lack of external beauty. With regard to speed and horsepower he is fairly indifferent, but he must have style. A motor car to him is not merely a thing in which to hurry across the country; it is a symbol of his place in the community, a possession to enhance his importance. Its appearance must please his eye, its fittings accommodate themselves luxuriously to his person; it must be a setting worthy of his dignity. He judges a car by its appearance first, and if he needs must content himself with a cheap car, the handsomest one gets his money. A few extra coats of paint do not constitute a great price to pay for the advantage of making a good first impression.

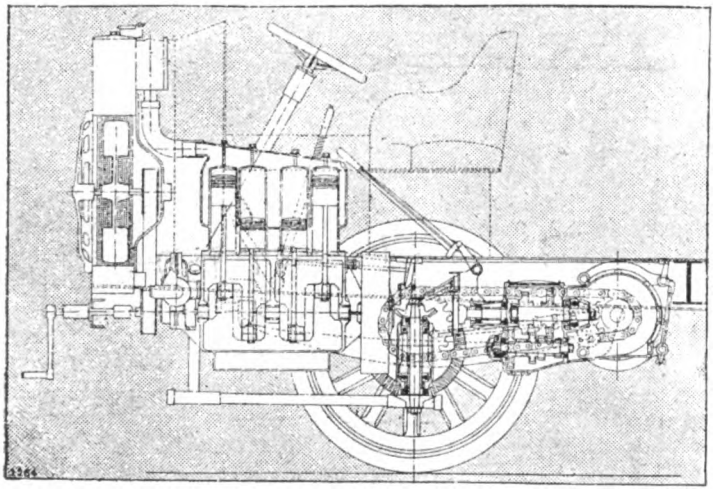
Cars are preferred with dark blue, dark green, cream, yellow, or French gray bodies, with khaki or gray hoods and screens framed in oak or teak with brass fittings. The importance to American manufacturers of changing the black color of their cars to brighter colors and the nickel fittings to brass for the Ceylon and Indian markets can hardly be too strongly emphasized, as both natives and Europeans greatly prefer the latter and are willing to pay considerably more for cars whose appearance pleases them than for the same car or even a superior one the appearance of which they do not like. It may be taken as axiomatic that all low-priced cars brought into this market are sold on first impressions; and if the first impression is a

bad one, a sale is difficult. So strong is the belief in this district that American cars are inferior to European cars in point of style and finish that it would be a practicable impossibility to sell a high-priced American car here even if its appearance compared favorably with Eureopean cars of the same price. It is not likely, however, that there will ever be any considerable market in Ceylon for medium or high-priced American cars, as local prejudices and the ties which bind the island to the mother country are too strong to be overcome without much patience and effort.

FRONT DRIVE TRACTOR

It would seem that the front drive commercial car ought to prove very serviceable. It is a reasonable construction. It ought to be sturdy. It gives the loading platform depth that is very desirable. The French Bezancon patent was one of the first. It is controlled, we believe, by the makers of the Mass car. We have found in Commercial Motor a description of this car which we brief in the interest of those who want to know about the possibilities of such construction.

This particular system of transmission incorporates a low ratio of gearing, consequently the engine, considering the load carrying capacity of the machine is a small one. It is of the vertical type, having four cylinders cast en bloc, and the bore and stroke are 80 mm. by 140 mm. respectively. Centrally disposed forward of the front axle, the four cylinders run parallel with the frame. The power unit is mounted on a sub-frame, which is of pressed steel, of channel section and wood packed.



There is little unsprung weight, consequently the engine is not subjected to undue shock. All the valves are placed on the near side of the engine, and are easily accessible from the driver's platform.

The cooling system is by means of pump and Solex type of radiator. The power is transmitted through a leather-faced cone clutch. The speed change and the differential gears are enclosed in one casting. This is located immediately behind the clutch, the whole being carried on the engine sub-frame. Four speeds and reverse are provided, the respective gear ratios being 4, 7, 9 and 12 miles per hour.

The differential shafts project outwardly from the frame sides, and the sprockets fitted thereto take the drive, which is transmitted through a light roller chain. Adjustable radius rods are fitted.

A differential locking device is provided so that in the unlikely event of a chain's breaking when the machine is being maneuvered over rough ground the vehicle is not rendered temporarily helpless. The disposition of the chain transmission is shown.

A distinctive feature is the method of transmitting the power to the front road wheels. Each forward chain wheel is situated over the front axle close to the swivel pins. The same shaft has at its outer end a small bevel which meshes with a second bevel wheel, horizontally disposed at the top of each swivel pin, thus forming a pair of mitre gears. At the bottom end of the pin is fitted a further bevel pinion, which engages with the crown bevel bolted to the hub of each front road wheel.

The general system is compact, the whole gearing being suitabily enclosed in an oil-tight casing. This arrangement in no way interferes with the steering.

The main suspension is by means of four semi-elliptic springs, and there is no unsprung weight of either engine or transmission.

The frame of the tractor proper, that is the frame carrying the whole of the transmission gear, is of pressed steel. Let into this, and secured by bolts, are two heavy timbers, which make up the rear portion of the frame. This construction has been adopted with the idea of overcoming shock absorption. If desired, the frame can be of channel or pressed steel.

The disposition of the engine and transmission lends itself to a remarkably clear chassis, no single point of the transmission gear projecting above the sides of the frame, which, behind the driver's seat, are but 24 inches from the ground. As is to be expected, tihs type of tractor allows for the provision of an ample sized body. The length available for this purpose, on the model shown, measures 12 ft. 8 in. The wheelbase is 10 ft. 9 in., and the transverse dimension over hub caps is 7 ft. 6 in.

AUTOMOBILE LEATHER SCARE

Some time ago it was stated that the popularity of automobiles had caused such demand for leathers that it was becoming difficult to obtain all that was wanted. The industry has become a great consumer of leather, but at the same time the production of horse-drawn carriages has declined somewhat.

It must not be forgotten that hides of leather used for auto purposes can be split into three portions. As a matter of fact, tanners of automobile leathers have been complaining for some time of dull demand, and the majority of these tanneries are doing little or nothing at present.

"YOUR NEW CAR"

A most interesting little book is issued by the Perfection Spring Co., of Cleveland, O. It is to promote the product made by the company, but it goes about it in a way that is a clean departure from usual trade literature for such purpose. It is really a scientific treatise in popular, easily understood words that make up a story of live interest. There is not an uninteresting page. What catalogue was ever like that? We believe all spring users will know a lot more about springs and spring metal than they now know, if they get a copy.

TO MARKET NEW PATENTED AXLE

The Greening Axle Co., Middletown, N. Y., has installed an oxy-acetylene welding outfit, which they will use in welding the caps on their patent axles. This axle is just being perfected and will shortly be put on the market. The gentlemen interested are W. J. Greening and D. L. Decker.

CALENDAR

Hoopes Bros. & Darlington, Inc., West Chester, Pa., whose wheels are in the preferred class, has issued a convenient calendar, and favored us with a copy.

BRISTLE BRUSHES HIGHER IN ENGLAND

Painters' brushes have been advanced five per cent. by the English makers of such goods, the advance taking effect in October of last year.

OBITUARY

Newton A. Carmean, 62, died December 30, in the Good Samaritan Hospital, Los Angeles, Cal., of Bright's disease. Mr. Carmean had been convicted of contributing to the delinquency of young girls and was sentenced to 15 years in San Quentin prison, but death intervened. He was well known in Marshalltown, Ia., where 25 years ago he established the Rhoades-Carmean Buggy Co., which failed 11 years ago. He subsequently moved to Los Angles where he opened a carriage factory. His body was cremated.

Alfred Carman, 74, a retired carriage manufacturer of Thornhill, Canada, died December 15. He was born in Thornhill and moved to Toronto 15 years ago. His widow and seven children survive.

E. A. Chew, 23, a former traveler for Parry Mfg. Co., Indianapolis, Ind., died at the home of his mother, Urbana, O., as the result of an operation for appendicitis. Mr. Chew was unmarried, and his entire business experience had been in connection with the Parry company. His father, W. P. Chew, preceded him in service with the company and died suddenly while on the road about four years ago. Following the death of his father, Edward, an only child, went to Indianapolis and accepted an office position in the sales department. He was soon assigned to road work and has traveled in northern Missouri, southern Indiana, and at the time of his death was covering northern Ohio and northwestern Pennsylvania.

Samuel F. Houston, 81, secretary and treasurer of the D. Wilcox Mfg. Co., Mechanicsburg, Pa., died December 8, of pleuro-pneumonia. Mr. Houston early in life learned the harness making business. After working at this trade about four years he traveled through several of the western states, and later engaged in business for himself at New Kingston, Pa. In 1859 he located in Mechanicsburg, where he carried on the harness making trade until 1863. He was engaged in various mercantile pursuits until a few years ago, when he retired from active business. For 25 years he had been treasurer of an insurance company and a director of the First National Bank of Mechanicsburg, and ever since the organization of the D. Wilcox Mfg. Co. he had filled the office of secretary and treasurer. Three times Mr. Houston was elected chief burgess of his city, and also served as county treasurer for three terms. His wife and three sons survive him. At a special meeting of the board of directors of the D. Wilcox Mfg. Co., held at the office of the company, Mr. Wilcox made a report of the death of Mr. Houston and a committee was appointed to draft suitable resolutions. M. E. Anderson was chosen secretary and treasurer to succeed.

George Huston, 68, formerly a carriage and wagon manufacturer of Columbus, O., died at his late residence in that city. He operated the business until eight years ago, when he sold out to enter the hotel business.

Joseph A. Jackson, well known carriage and automobile dealer of Richwood, N. J., dropped dead of heart disease on North Second street, Philadelphia, December 17. Mr. Jackson had gone to Philadelphia with his wife, and was attending to some business while Mrs. Jackson was engaged in shopping.

John Corrigan Kelly, 70, one of Philadelphia's oldest carriage builders and proprietor of a carriage shop that built a vehicle for General Washington in colonial days, died at his home on December 24, following an illness of six days from a complication of diseases.

Harry J. Mummery, 43, at the time of his death employed with the Pierce-Arrow Motor Car Co., died November 6 of a nervous breakdown and throat trouble. Mr. Mummery had experience in the carriage trade in Hamilton, Ont., and Buffalo, N. Y. Later he went with Brewster & Co., New York, and attended the C. B. N. A. Technical School in the years 1899-1903. After graduation he entered business for himself at Hamilton, Ont., but later sold out and accepted a position with the Pierce-Arrow Motor Car Co., where he was employed at the time of his death.

Robert M. Rocap, 80, for many years a carriage manufacturer at Bridgeton, N. J., passed away November 28, after an illness of several weeks.

Wendell Schwanz, 74, for many years actively engaged in the manufacture of wagons in Tipton, Mo., died in that city December 13.

John M. Smith, 82, pioneer carriage builder at Atlanta, Ga., died December 13, following an attack of paralysis. The immediate cause of his death, however, was pneumonia. Mr. Smith was born in Ireland, and spent his childhood and boyhood in Canada. He moved to Atlanta in 1869, shortly after he entered the carriage manufacturing business and built up a large business. He retired from active business several years ago, leaving the management of the plant in the hands of his son, John E. Smith. His wife, three sons and two daughters survive.

Jonas Swab, 70, died December 22, at his home in Elizabethville, Pa. He was the founder of the Swab wagon works, having established it in the year 1868. Mr. Swab was a veteran of the civil war. He is survived by a widow and one daughter.

PRACTICABILITY OF RUBBER PAVEMENTS

The contemplation of the great increase in the crude rubber supply within the next few years invariably prompts the question—what will we do with it? And the readiest answer to the question seems to be—rubber pavements.

Any consideration of the practicability of rubber pavements brings us at once to the three examples of this sort of road construction to be found in London, viz., the court yards of the Savoy and Claridge's hotels and the approach and exit of the Euston railway station. These are the noteworthy instances of rubber pavements which have been laid a sufficient length of time to afford a practical basis for discussion. The two hotel court yards were paved with rubber, one ten and the other thirteen years ago, the primary object being to deaden the clatter of the horses' hoofs and the rumble of the wheels. The pavement was in the form of slabs about 2½ inches in thickness. These slabs seem to have served their purpose very satisfactorily. They have worn in spots to one-half their original thickness, but from present appearance give promise of several more years of service. To be sure, they have not been subjected to the extreme wear of the heavy trucking on the ordinary roadway, but in one respect their treatment has been unusually severe, for they have had to endure the wear of the constant turning of vehicles. Another trying experience that has come to them latterly has been the use of studded tires. These steel studs are not beneficial to any sort of roadway, but on rubber their effect is naturally especially injurious. The oil of the motor car is another foe to rubber roads; but notwithstanding these unfavorable conditions the rubber covering in these London hotel yards has given a good account of itself.—India Rubber World.

WAGON LOAD PER HORSE

One ton per horse is considered a fair wagon load, but when it is a question of runners instead of wheels, the proportion goes up by leaps and bounds. Even the load that can be carried over snow on runners has a limit, however, and it would seem that 29 tons to the horse would be far beyond it, were not evidence to the contrary at hand. This load of 200 logs, estimated by the U. S. Forest Service to weigh 177 tons, was hauled from Pine Island, Minn., to the railroad shipping point, 15 miles distant, by six horses.

GROWTH OF AUTOMOBILE INDUSTRY

In a recent address delivered by Chares Mears, of the Winton Company, before the Cleveland Advertising Club, Mr. Mears presented the following interesting statistics relative to the growth of the automobile business since 1898:

Starting from nothing in 1898, fifteen years ago, the automobile industry in America has grown at such high speed and to such volume that adjectives are lacking to properly describe the achievement. Steam and electricity, which preceded gasoline, were soon left far behind.

Of the 990,000 cars now registered in the various states, more than 900,000 are gasoline cars, and these easily represent a value of $750,000,000 or more.

Complete and accurate figures showing the growth of the gasoline industry from year to year are not available. However, census reports show that in 1904, 18,000 cars were produced at a value of $19,000,000 and that in 1909, four years ago, 120,000 cars were produced at a value of $135,000,000. Thus 1909 produced 102,000 more cars than 1904, and the value was $116,000,000 greater.

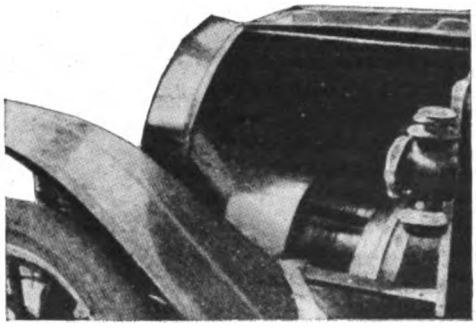
For 1912 the output is estimated at 250,000 cars, valued at from $250,000,000 to $300,000,000. Thus the product and its value have more than doubled in three years.

An early handbook contains a list of 270 houses that comprised the infant automobile industry in 1900. This list included prominent retailers as well as manufacturers. Only twelve of 270 are in business today. The other 258 have passed away. Death rate, 95 per cent.

Today, in 1913, the bulk of the gasoline car business in this country is handled by not more than 200 manufacturers.

GAS ENGINE BUILT OF JUNK

A little rotary gas engine, built out in the Mojave desert, contains parts from an old wagon tire and some pieces of discarded tubes, which form the cylinders, while a brass cartridge shell is a part of the carburetor. This model, actually perfected with these crude bits of junk, delivered the horsepower that its inventor had estimated, and, with a few improvements, it



is the model upon which sixty horsepower engines are now being built. The engine was found to be well adapted for aeroplanes, because of its small weight compared with its great power. This small weight is caused by a simplicity of construction that eliminates about 450 parts required in an ordinary engine of the same capacity.

After being proved a success in air craft, the new rotary was developed as a motor car engine, and the first large one built has run 10,000 miles and more without showing any defects, and is apparently as good as the day it was built.

MOTORS IN AFRICA

One of the largest increases in the Union's (Africa) imports for the year was in motor cars and motor cycles, and in this increased trade, particularly that of motor cars, the United States made a good showing, the American sales advancing from $208,130 in 1911 to $700,800 in 1912. The total value of imports of motor cars and parts into the Union for 1912 amounted to $2,812,467, as against $1,800,493 in 1911. Imports of American motor cycles into the Union increased from $5,012 in 1911 to $20,979 in 1912.

The sales of American cars by dealers in the city of Johannesburg, where there are in the neighborhood of 1,300 or 1,400 machines in operation, are confined to about 12 makes of the cheaper or medium grades. A canvass of the importers discloses that during 1912 about 240 American cars were sold in the Transvaal, the sales at retail figures aggregating about $410,000.

There is just now an unusual demand for American cars retailing here from $1,000 to $2,500, and the prospects are that the sales for 1913 will be considerably in excess of last year. A good market for American automobiles of the cheaper type also exists in the Orange Free State and Rhodesia, where there were good sales during the year.

STRESSES EQUALIZED IN CHAIN DRIVE

Formerly when chains were used in touring cars the differential was accommodated in an extension of the gearbox and the box itself was supported partly by the differential shafts. This form of construction provided a most difficult assembly in that it had to be truly in line in three plants and any whip of the frame caused bending of the differential shafts which, according to their magnitude, might or might not cause a permanent deflection in the shafts. This form is seen in but few instances now, such as the Berliet and Benz, most others having the differential housed in a separate casing and affixed to the frame by the housing, thus relieving the shafts of all stresses other than the torque due to driving or braking. It is hardly necessary to mention all the advantages of this design as they will be fairly obvious. In quite a large number of chassis the same axle that is used as a live axle on pleasure cars or lighter trade vehicles is employed, without the spring table and brake brackets, as the differential casing carrying the shafts on which the chain sprockets are fixed. To quote an example, the Adler chassis is fitted with the same differential and case that forms the live back axle on the 40 horsepower touring car. By taking the drive through a shaft provided with universal joints from the gearbox to the differential, any whip in the frame will not throw a stress upon either of the transmission cases or any of the driving shafts.

ART CAPS

The radiator caps of automobiles in France are ornamented by various models of figurines, animal subjects mostly, that have all the grace and modelling of a real statuette. We should judge the expense was considerable.

BEST YEAR IN ITS HISTORY

The Nisson Wagon Works, at Winston-Salem, N. C., had the best year in its history according to a statement in a local paper. The company claims to have shipped a string of wagons 40 miles long during 1913 and then was not able to supply the demand.

BUYS AUTO END OF MICHIGAN BUGGY CO.

The automobile end of the Michigan Buggy Co. was purchased December 10 by Nathan Gumbinsky for $10,000.

PUT ON A NIGHT SHIFT

The Hale Buggy Co., at Anniston, Ala., is running double time. Has increased capital as well as capacity.

Trade News From Near and Far

BUSINESS CHANGES

W. J. Nicholson has sold out his business in Lovilia, Ia., to Keeton & Co.

Mass & Thomas have purchased the S. J. Davidson business in Turton, S. D.

Shirley & Flora have succeeded to the business of Covington & Flora, in Leon, Ia.

Wilson & Stoffer have purchased the business of Walter Bennett, in Clayton, Mich.

G. U. Dodge has purchased the business of Whitehead & Alexander, in Sioux City, Ia.

J. M. Babb has purchased the stock of vehicles, etc., of F. W. Wake, in Fullerton, Neb.

W. H. Bowman has purchased the business of Fitzsimmons & Weimer, in Carleton, Neb.

G. M. Oldre has succeeded to the business of Oldre & Schmidt, in Garretson, S. D.

M. M. Melchert has purchased the business of W. H. H. Bonebrake, in Williamsburg, Kas.

Elwood H. Abbott has purchased the stock of vehicles, etc., of Walter Bunch, in Winigan, Mo.

W. H. Wilmer has disposed of his buggy business in Glenwood City, Wis., to V. S. Monroe.

A. J. Roe has purchased the vehicle and implement business of W. H. Green, in Creighton, Neb.

L. M. Lines has disposed of his stock of vehicles, etc., in Winchester, Kas., to Geo. W. Young.

T. J. Colligan has sold out his stock of vehicles, etc., in Thurston, Neb., to Ribanek & Pallas.

McCabe Bros. have purchased the stock of vehicles and implements of Smith Bros., in Lewis, Kas.

G. H. Martin has disposed of his carriage business in Murray, Ia., to E. B. Piper, of Corning, Ia.

Rasmussen & Larson Bros. have purchased the business of Geo. D. Stewart & Co., in Viborg, S. D.

Butchel & Castillo have succeeded S. C. Manifold in the vehicle and implement business in Coin, Ia.

M. M. McElhinney, of Superior, Neb., has purchased the business of Hutchinson & Ely, in Nelson, Neb.

J. P. Brennan & Co. have purchased the stock of vehicles and hardware of C. Thoreson, in Mohall, N. D.

C. M. Harvey has taken over the interest of M. L. Pierce in the Pierce-Harvey Buggy Co., in Miami, Okla.

J. H. Wilson, the buggy and harness man at Bedias, Tex., has sold his business to F. E. McDonald and Orgin Wilson, who will continue the business at the same stand.

Garny Bros., wagon and carriage manufacturers and repairers at South Orange, N. J., have dissolved partnership.

Jud. B. Wallis has purchased a half interest in his father's wagon shop at Somonauk, Ill., and the business hereafter will be conducted under the name of C. J. Wallis & Son.

Henry P. McElroy, carriage builder of 50 years standing, at Baltimore, Md., has sold out his business to Philip Kraemer, who conducts a livery business in the adjoining building.

A bill of sale filed for record at the court house conveys the interest of J. S. Thompson and W. H. Willoughby in the Vehicle Supply Co., at Peoria, Ill., to M. S. and C. C. Carter.

The James Mfg. Co. has purchased the wagon works of Landgraf & Wandschneider, at Ft. Atkinson, Wis. Messrs. Carl and Fred Wandschneider will both be employed by the James Company.

The Eufaula Buggy Co., a Birmingham, Ala, partnership engaged in the manufacture of buggies, will be reorganized shortly as a corporation, according to E. R. Pruden, one of the partners. The company was formerly a corporation but dissolved.

NEW FIRMS AND INCORPORATIONS

E. W. James is about to open a stock of vehicles, etc., in Columbia, Mo.

E. W. Monroe has opened a new stock of vehicles, etc., in Chandler, Ariz.

P. W. Myron has opened a stock of vehicles and implements in Mineral, N. D.

August Ossenkop has opened up a new stock of vehicles, etc., in Louisville, Neb.

Jacobson & Peterson have opened a new stock of buggies, etc., in Makoti, N. D.

R. S. Haun has engaged in the vehicle and implement business in Cambridge, Ia.

A wagon factory and repair shop is to be erected at Byfield, Mass., by Mr. Walton.

The Myers Co. has opened a new stock of vehicles and implements in Las Cruces, N. M.

Lamkin Bros. are adding a buggy and automobile stock to their business in Huntsville, Tex.

Loosbrock & Ludwick have engaged in the vehicle and implement business in Loretto, Neb.

T. P. Scott has engaged in business in Gettysburg, S. D., and will handle a line of wagons and buggies.

Nels L. Larsen, of Villisca, Ia., has engaged in the carriage and implement business in Red Oak, Ia.

The Pratt (Kas.) Hardware & Implement Co. has opened for business, and carries vehicles of all kinds.

W. W. Groves is about to open a new stock of buggies, etc., in Nampa, Idaho, going to that point from Meridian, Idaho.

The H. Barkow Co. has been incorporated at Milwaukee, Wis., to handle wagons, carriages and automobiles, capital $15,000, by Louis Lee, M. J. Lippert and Louis F. Koenig.

A new 60 x 60 sheet steel building is being erected at Washington C. H., Ohio, which, when completed will be occupied by Geo. Melvin and his father-in-law, Clay Thompson, with a complete line of buggies.

A wagon and implement factory will be established at Heber, Ark., by E. H. Ewing, Earl Brice and Louie Thompson. Mr. Ewing was president of the Ewing Lumber Co. at that place, and whose plant recently was destroyed by fire.

The Evansville (Ind.) Buggy Co., recently incorporated for $10,000, will also manufacture harness, saddlery and accessory goods. The three directors are Frank Kleiderer, L. Bonnell and John J. Delker, the latter two of Henderson. Delker is understood to be the leading spirit in the company. He was formerly a partner in the Delker Bros. Buggy Co., of Henderson, and is at present head of the Park Carriage Co.

IMPROVEMENTS AND EXTENSIONS

Wm. Martinson is building an addition to his wagon plant at Manistee, Mich.

The Schreiber Carriage Co., of Charlton, Ia., is about to enlarge its shops.

O. Bartelson & Co., of Fergus Falls, Minn., are erecting a $20,000 warehouse.

The Bearden Buggy Co., at Nashville, Tenn., has increased its capital from $50,000 to $90,000.

Brownlee & Brieden are erecting a new building for their hardware and vehicle stock in Stockdale, Tex.

The Schurmeier Wagon Co., Minneapolis, Minn., is erecting a $15,000 addition, to be ready for occupancy in March. It will house a blacksmith shop, paint shop, and assembling room, as well as the machinery used in building wagons and buggies.

The Hickman (Ky.) Wagon Co., which is owned by S. L. Dodds of that city, is adding more room to its plant, building a large new warehouse, located just south of their factory, a two-story building, which will be used for storage of material.

S. S. Pine & Son, Spartansburg, S. C., recently installed a lot of new modern machinery in their wagon and carriage plant. A new elevator with 6,000 pounds capacity has also been installed and a 50 foot addition has been erected in the rear of the present two-story structure.

H. M. Totman, Erie, Pa., has procured a building permit for a new concrete, brick and steel building to be used as a carriage works, which will be built on the east side of French street between Twelfth and Thirteenth streets. The building will be two stories high and 44 x 130 feet. The estimated cost, exclusive of the foundation, is placed at $10,590.

DOINGS IN THE AUTO TRADE

Fillman Bros. are opening a new automobile business in Homer, Neb.

Smith & Middaugh have engaged in the automobile business in Scottsbluff, Neb.

A. E. Ausman is about to establish an automobile works in Chattanooga, Tenn.

Geo. H. Herring has purchased the business of the Kearney Auto Co., in Kearney, Neb.

The Central Motors Co. has been incorporated in Owensboro, Ky., with a capital of $1,000.

The Newton Motor Co. has been incorporated in Newton, N. C., with a capital of $10,000.

It is reported that the Standard Motor Co. is about to establish a factory in Hopkins, Minn.

The Ford Motor Car Co., of Detroit, is to establish a distributing agency in Louisville, Ky.

The LaCrosse Motor Co. has been incorporated in LaCrosse, Wis., with a capital stock of $10,000.

The Tri-State Auto Co. has been incorporated in Memphis, Tenn., with a capital stock of $15,000.

The Cabarrus Motor Co. has been incorporated in Concord, N. C., with a capital stock of $10,000.

The Stutz Motor Car Co., of Boston, has been incorporated with $30,000 capital by M. P. Chase and others.

The Covington Co. has been incorporated in Florence, S. C., with a capital of $15,000, to handle automobiles.

The Automobile Remodeling Works has been incorporated in Birmingham, Ala., with a capital stock of $5,000.

The Dunham Motor Car Co., capital $10,000, has been incorporated at Cleveland, O., by L. A. Dunham and others.

The Edisto Automobile & Machinery Co. has been incorporated in Orangeburg, S. C., with a capital stock of $8,000.

The Fuquay Motor Car Co., capital $25,000, has been incorporated at Fuquay Springs, N. C., by C. W. Howard and others.

The Meteor Motor Car Co. has been incorporated at Piqua, O., capital $50,000, by W. K. Boal, C. W. Magee and others.

The Tri-State Motor Car Co., capital $10,000, has been incorporated at Wheeling, W. Va. G. E. Griffin has been chosen president.

The Stegman Motor Car Co. has been incorporated at Chicago with $10,000 capital by D. H. Burklan, R. C. Flodin and E. E. Burklan.

The Black & Frazier Motor Car Co. has been incorporated at Columbia, N. C., by James M. Black and J. G. Frazier; capital $25,000.

The L. A. VanPatten, Inc., capital $60,000, has been incorporated in New York City to deal in motor vehicles, wagons, etc., by A. G. Thaanum and others.

The Baker Automobile and Machinery Co. has been incorporated with capital of $2,100, at Billings, Mont., by P. L. Baker, Arthur Barth and M. M. Barth.

The Louisville (Ky.) Motor Car Co., capital $5,000, has been incorporated by R. T. Durrett and others.

The Ironton (Minn.) Motor Car Co. has been incorporated with a capital of $50,000. Garfield Murphy is president, Carl Dandrea, vice-president, and P. D. Kreitter, secretary and treasurer.

The Interstate Automobile & Supply Co. has been incorporated at Davenport, Ia., with a capital of $25,000. President and treasurer, F. A. Seeman; vice,president and secretary, R. E. Beedee.

Victor Motor Car Co., Greenville, S. C., has been incorporated with capital stock of $100,000, to manufacture automobiles; will build electrically operated plant to have an annual capacity of 2,000 cars.

The Lewis Motor Co., capitalized at $250,000, has been incorporated in Racine, Wis., to manufacture a medium-priced light "six." William Mitchell Lewis and Rene Petard are the chief incorporators.

FIRES

The stock of vehicles, etc., of G. W. Owen, in Spencer, Okla., has been damaged by fire.

The stock of vehicles, etc., of Michael Riverness, in Humboldt, S. D., has been burned.

The Crews Wagon Works, at Birmingham, Ala., suffered a $1,500 fire loss on December 27.

The stock of vehicles, etc., of Janet, White & Knapps, in Garden City, S. D., has been destroyed by fire.

The carriage manufacturing plant of D. K. & M. H. Apgar, at Califon, N. J., was destroyed by fire, December 17.

The store and carriage warehouse of the W. J. Hefler Hardware and Carriage Co., at Texola, Okla., was destroyed by fire, December 17.

Fire of unknown origin completely destroyed the plant of Kremer & Sons, vehicle manufacturers at Springboro, Pa., December 16, causing a $6,000 loss.

The warehouse of the Griffin Hardware Co., Carlisle, Ind., was visited by a fire on the morning of November 4. A large part of the stock was destroyed, but a number of wagons were saved.

The factory of the Louisburg (N. C.) Wagon Co. was destroyed by fire December 17. The office, paint room, a storage room, the engine and boiler were saved, but the main building containing much valuable machinery was a complete wreck.

FROM "WORKS" TO "COMPANY"

The Florence Wagon Works at Florence, Ala., has emerged from its troubles, and is now reorganized as the Florence Wagon Company. C. W. Bransford is at the head of the organization; T. C. Harlan is vice-president as formerly; E. W. Henly, treasurer; H. A. Bradshaw, secretary. The reorganized factory starts with a lot of orders.

FORCED TO RESUME OPERATIONS

The Abingdon (Ill.) Wagon Co. was forced to cut short its work of inventory and resumed operations January 2. The factory was to have remained closed all week, but the rush of orders compelled them to start up earlier than had been intended.

There are 160 annual holidays in Russia on which days it is a sin for the workman to work.

CROSSROADS MIRRORS

In England they suggest as a safety device looking glasses at four-corner road crossings. A writer in Cyclecar holds forth thus:

I am rather surprised that so little has been done by the road improving authorities in safeguarding dangerous corners by means of mirrors. It is often possible in towns to be warned of oncoming traffic at a cross street by looking for the reflections in the shop windows bordering the corners. Mirrors would, however, be a much better solution of the difficulty. They have been tried, I believe, both in Harrogate and Wilton, near Salisbury, and in both cases they are most effective. Some trouble has been experienced with the backing of the glass perishing, but if it were properly air and water-proofed, this should soon be overcome. There are hundreds of blind corners all over the country where mirrors might be erected in place of the usual danger signs. They should not be much more expensive than the three or four warning signs so often erected at the same bend, and, if placed fairly high up, perhaps on the wall of a house, they would not be damaged by flying mud.

PNEUMATIC TIRES MADE OF HORSEHAIR

A thousand people of all nationalities are working all the time on some substitute for the pneumatic tire now in general use. A couple of Frenchmen have hit on something different from the rest. They have taken out a patent for a resilient tire to be made of sheets or bands of compressed horsehair wound around a core; this core may be either solid or hollow metal, or it may be a rubber air chamber, or may consist of still more compressed horsehair. There may be few or many layers of horsehair, an outside cover being made of canvas; but the body of the tire is to be of horsehair, and it is from that article that its resiliency is to come.

This is certainly adding insult to injury; not only is the poor old horse driven out of his job by the motor car, but his mane and tail are to be plucked to constitute the tires. Why not go a few steps further and make the rims out of compressed horse hoofs, and the spokes out of his ribs, and upholster the car with the poor old fellow's hide?

Representatives of eleven gasoline motor manufacturers met recently at Cleveland, O., and organized the Automobile Engine Manufacturers' Association, for the purpose of promoting friendly relations between the makers of automobile motors.

WANTS

Help and situation wanted advertisements, 1 cent a word; all other advertisements in this department, 5 cents a word; initials and figures count as words. Minimum price, 30 cents for each advertisement.

PATENTS

Patents—H. W. T. Jenner, patent attorney and mechanical expert, 606 F St., Washington, D. C. Established 1883. I make a free examination and report if a patent can be had and exactly what it will cost. Send for circular.

SITUATIONS WANTED

A practical, competent top factory superintendent, with wide experience and best credentials, desires a similar position; any locality. Address Box 40, care The Hub, 24 Murray St., New York City.

Wanted—Position as superintendent in carriage factory, by capable man with several years' experience as foreman and superintendent. Best credentials. Address Box 18, care The Hub, 24 Murray St., New York City.

Position wanted as trimmer foreman, with good automobile or carriage company. Thoroughly experienced man. Good references. Address Box 20, care The Hub, 24 Murray St., New York City.

THE VALUE OF STANDARDS

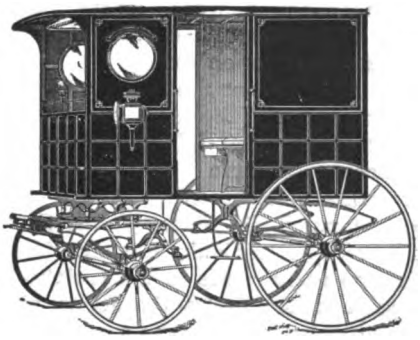
In a keen analysis of the benefits that have accrued to the manufacturer through standardization work, Henry Souther, chairman of the Standards Committee of the S. A. E., made a strong appeal for a closer standardization work.

Mr. Souther said: "The management that carries standardization to the highest degree of perfection must succeed. The management that does not do so must fail in the long run. It is not possible, for instance, to produce a good cheap vehicle made up of parts that are not standardized."

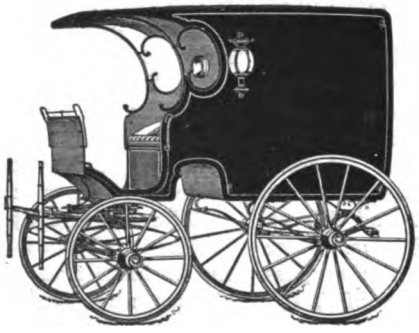
Referring directly to the automobile industry, Mr. Souther declared: "It is a grave mistake to think, as some do, that the business man can find no useful place in the society. On the contrary, the business man accelerates the action of our Standards Committee wherever one is found as a member."

Put borax in the glue in hot weather to keep it from molding. It won't hurt the adhesive power.

INDEX TO ADVERTISERS

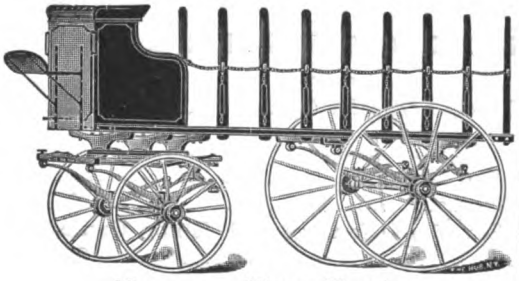


No. 112.—Milk Wagon.

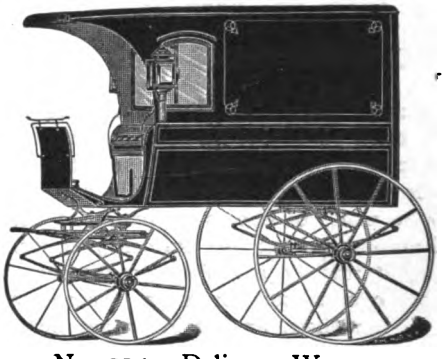


No. 111.—Altman Wagon.

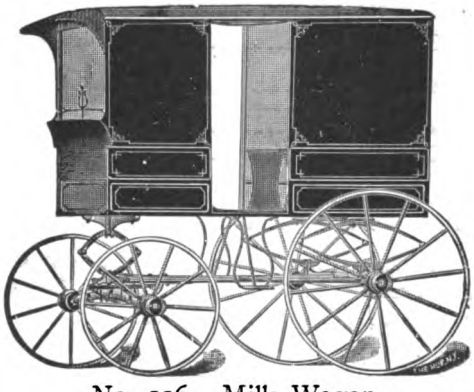
No. 113.—Grocery Wagon.



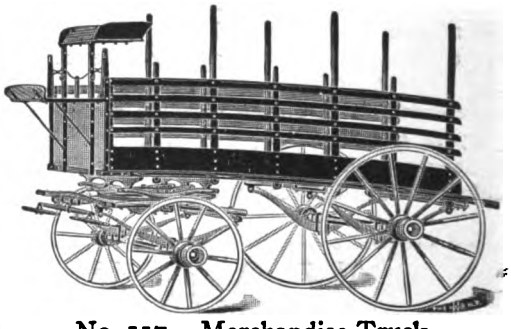
No. 122.—Flour Truck.



No. 115.—Delivery Wagon.

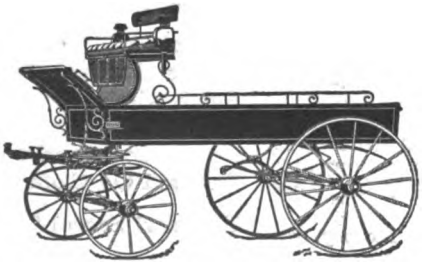


No. 116.—Milk Wagon.

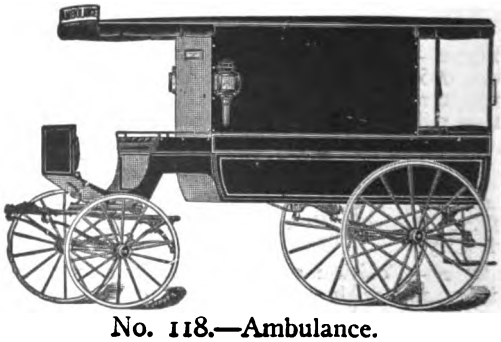


No. 117.—Merchandise Truck.

No. 114.—Delivery Wagon.



No. 124.—Delivery Wagon.



No. 118.—Ambulance.

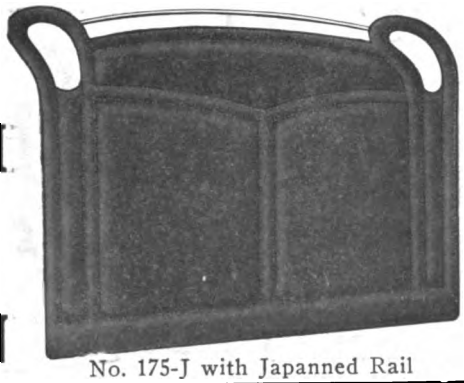
BUSY BUYERS BRIEFS

McKINNON DASH COMPANY

BUFFALO, N. Y.

TROY, OHIO ST. CATHARINES,
CINCINNATI, OHIO ONTARIO

Try Our No. 175 J. DASH For Your 1914 ROAD WAGON



No. 175-J with Japanned Rail

Remember to Call for

JAPANNED RAIL PADDED DASHES

For All Vehicles

"BLACK VELVET" CUSHION SPRINGS

Manufactured Only by the

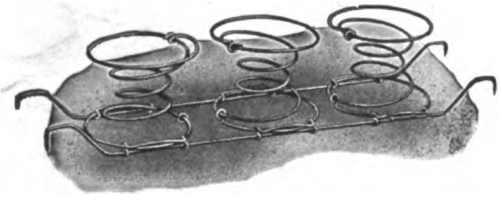
NATIONAL SPRING AND WIRE COMPANY

ALBION, MICH. WINDSOR, ONT.

THE SPRING OF QUALITY.

SPRING or SOFT EDGE CUSHION FRAME

For Buggies or Other Vehicles. Built of the Highest Grade of Steel Wire.



STRIP FOR WOOD OR BOX FRAME

WILLEY'S COLORS

The RECOGNIZED STANDARD

C. A. WILLEY CO.

COLOR GRINDERS

and Manufacturers of Specialties in

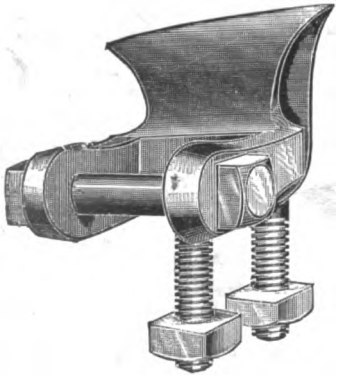
CARRIAGE, AUTOMOBILE AND CAR

PAINTS

COLORS, VARNISHES, ETC.

HUNTER'S POINT, NEW YORK CITY

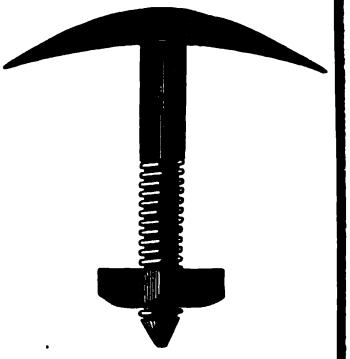
Skewed Shaft Couplings



Regular or Oval Patterns
For High Arched Axles

Furnished in rights and lefts for any height of arch. Oval Axle Clips ⅝ or ¾ width to match Oval Couplings. Bolts, Clips, Couplings, Carriage Hardware and Special Forgings

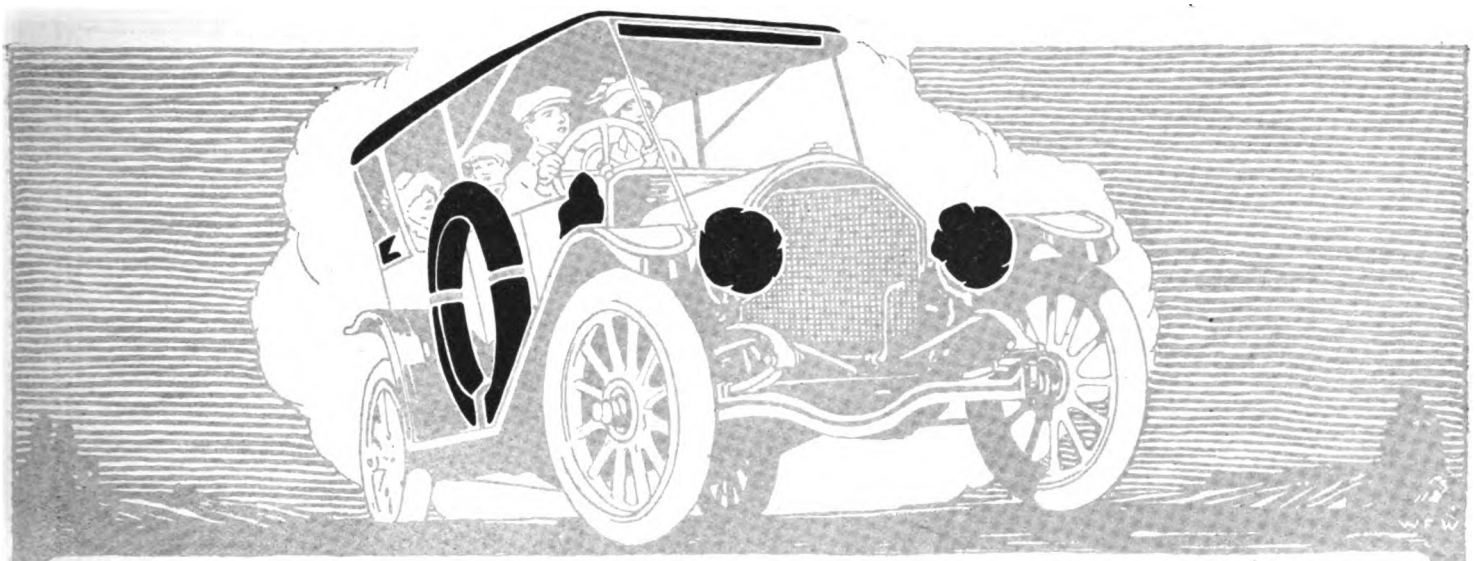
Catalogue "H" and Prices on Application



COLUMBUS BOLT WORKS, Columbus, O.

The Hub

TRADE NEWS PUBLISHING COMPANY
24-26 MURRAY ST. NEW YORK



MERITAS LEATHER CLOTH

THE LEADING LEATHER SUBSTITUTE

Recently a manufacturer said: "I didn't think anybody could make an artificial leather cloth that would look so much like the real thing until I saw MERITAS LEATHER CLOTH."

That's the situation with dozens of carriage and auto builders.

We are ready to submit samples of MERITAS LEATHER CLOTH that will convince you we can save you money on your upholsterings, trimmings, curtains, etc.

MERITAS LEATHER CLOTH is being successfully used by manufacturers of carriage and auto accessories such as lamp covers, tire cases, trunks, storm aprons, buggy boots, etc.

Made in muslin, duck and drill, dull and glazed, smooth and grained, in black and colors.

Write us your requirements.

STANDARD OIL CLOTH CO.

320 BROADWAY, NEW YORK

The Hub

Entered in the New York Post Office as Second-class Matter

Vol. LV FEBRUARY, 1914 No. 11

THE TRADE NEWS PUBLISHING CO. OF N. Y.
Publishers of THE HUB

J. H. Wright, *President.* G. A. Tanner, *Secretary and Treasurer.*
24-26 MURRAY STREET, NEW YORK.

Other Publications of Trade News Publishing Co.:
HARNESS (monthly).....per year, $1.00
AMERICAN HARNESS AND SADDLERY DIRECTORY (annual).....per copy, $4.00

The Hub is published monthly in the interest of employers and workmen connected with the manufacture of Carriages, Wagons, Sleighs, Automobiles and the Accessory trades, and also in the interest of Dealers.

Subscription price for the United States, Mexico, Cuba, Porto Rico, Guam, the Philippines, and the Hawaiian Islands, $2.00, Canada, $2.50, *payable strictly in advance.* Single copies, 25 cents. Remittances at risk of subscriber, unless by registered letter, or by draft, check, express or post-office order, payable to the order of Trade News Publishing Co.

For advertising rates, apply to the Publishers. Advertisements must be acceptable in every respect. Copy for new advertisements must be received by the 25th of the preceding month, and requests to alter or discontinue advertisements must be received before the 12th day of the preceding month to insure attention in the following number. All communications must be accompanied by the full name and address of writer.

FOREIGN REPRESENTATIVES:

France.—L. Dupont, publisher of *Le Guide due Carrossier,* 78 Rue Boissiere, Paris. Subscription price, 15 francs, postpaid.

Germany.—Gustave Miesen, Bohn a Rh. Subscription price, 12 marks, postpaid.

England.—Thomas Mattison, "Floriana," Hillside Avenue, Bitterne Park, Southampton. Subscription price, 12 shillings, postpaid.

Entered in the New York Post Office as Second-class Matter.

The Cyclecar

If the cyclecar should make good according to the measure of present indications, that vehicle will become the real competitor of the wholesale buggy.

So far as we could ever determine, the full-fledged automobile was never a competitor for buyers against the buggy. They didn't class together. An owner could possess one of each, yet not consider there was any displacement of one by the other. We believe it is not uncommon to find both types of vehicle in the same barn, and each doing an appointed work that could not be done as well by the other.

The fear of the buggy builder, if we may assume he was afraid, and the self-assurance of the motor car makers, of which there was plenty of evidence, were both unjustified by the facts of the situation. The difference in cost alone put the vehicles in different classes, and kept them there.

With the cyclecar it is different. If the buying public is fired with a fancy for the little motor car, the demand will be met by a mushroom growth of makers. And herein lies the safety of the horsed vehicle builder. The work will be turned out with a feverish speed to get the dollar, and most of it will be rotten. It will be a constructional nightmare. But, if the strength of the idea persists with the buyer, then in time will come worthy work of real value, and refinements of manufacturing methods that will make a price of two hundred and fifty dollars, or thereabouts, look about right.

At this stage the battle will rage, and the buggy builder will know he is in a fight.

Why, because in the first place a price of two hundred and fifty dollars is not much, if any, in excess of a good horse, harness and buggy, so there is at once set up a price and value comparison.

Then the cyclecar is a vehicle of very light weight. The developed horsepower per pound of vehicle will make it as strong as Sampson, and the little power required to move inert weight will pull it out of all sorts of difficulties that anchor the true type motor car.

Its narrow track will enable it to negotiate bad roads even better than a horse and buggy. It will duck the wheel ruts and trundle along over any good going that is to be found, in the road or out of it. It will climb hills, road banks, and any usual obstruction that does not look good to a buggy or wagon, like a bear after honey.

It will accommodate two passengers, and it will trundle them over good roads at an astonishing speed, better than most motor cars can produce.

There are many more interesting points that could be catalogued, and will be at some future time. This is just to sketch what is, or may be, looming up as the real competitor of the buggy.

It would be too much to expect that the buggy builder would enter this field himself, but he could do so without violence to his interests or his factory organization as a buggy builder, though this proposition would be stoutly controverted. But of one thing there can be no argument:

If this little car catches on, there will be a sure enough fight for trade on the hands of the wholesale buggy builder.

The Publicity Campaign

We have not seen much or heard anything more of the stunts that were soon to be undertaken by the large and larger buggy builders to put the horsed vehicle in the lime light.

The following quoted remarks by a speaker addressed

to a body of vehicle and implement makers are worth reading again:

"If the manufacturers of implements and vehicles would spend 10 per cent. of their present advertising appropriation in team work to increase the general prosperity, I venture to say that the results would equal that of the other nine-tenths spent in the present hit-or-miss fashion.

"There is a time coming—not long distant—when every national association will appoint a committee on correlation to learn what the other organizations are doing, and these committees combined will unite the efforts of all the workers, without which no permanent plan for progress can be established."

We can't speak for the plow men, nor for the vehicle men, for that matter, but we can and do speak about them, which leads us to say that if the vehicle builders spent ten per cent. of their advertising appropriation in team work, it would be of no avail, because the amount spent by all of them bunched is so small in amount that ten per cent. of it would be negligible—there would be no team to work.

However, what the speaker said will bear the brunt of argument successfully. Combined effort in the general cause of the horsed vehicle would be a very wise use of money and printer's ink.

We heard rumors along about October last that there was soon to be planned a very comprehensive campaign of publicity for the good of the horsed vehicle, conducted on the co-operative plan, or team work.

We have not heard anything of it since, but it may have been put off until such time as the financial skies cleared without any intention of abandonment of plan. We hope this is the fact, because we would like to see an effort along the lines we have heard discussed, if only to curiously note the effect. We believe the results would justify the expenditure indirectly, but that would remain to be seen, which, in the main, accounts for our curious interest.

The wholesale buggy builder is not, and never was, an advertiser in the first definition of the word. We can't remember to have ever seen an announcement of a single manufacturer that was not weak when not ridiculous, as a result-producing effort. That may, in a manner, account for the shy way most of the builders spend money for publicity. They have not done it well when they have attempted it, so the results have brought discouragement and lack of inclination to try again.

The horsed vehicle is an exploitable commodity. There are many and strong points in favor of its very general employment. We think there are masses of people willing to be instructed therein.

To prosecute such a campaign of publicity is not an easy matter if it is to be done well, and the dollars are to be made to work as hard as the horse in the vehicle. We don't suppose there is an individual in the business capable of directing such an advertising campaign. This is no disaparagement of the natural ability that is to be found in the ranks of manufacturers. The work requires special training, that's all.

Forty-first Report

The forty-first annual report of the C. B. N. A. has been arranged and bound in its usual book form for issue to members. It is not as well done in some particulars as last year, but we suppose the imperfections will not be noted, as it is more than probable that its recipients file it so completely that it is never looked into or consulted.

Where Are All the Rich Ones?

The average net income of a farmer is $400 per year, after deducting five per cent. interest on his investment. These are department of agriculture figures.

Now, if this average farmer buys an average buggy for $75, he has only an average $325 remaining with which to "conduct transportation."

This tends to point out the fallacy of averages, which we are all so fond of instancing in our argumentative proposals.

The Sand-Clay Road

The sand-clay road is made by mixing the sand and clay in such a way that the grains of sand touch each other, the spaces between the grains being filled with clay which acts as a binder.

The approximate mixture of sand and clay may be determined by filling a vessel with a sample of the sand to be used and another vessel of the same size with water. The water is poured carefully into the sand until it reaches the point of overflowing. The volume of water removed from the second vessel represents approximately the proportion of clay needed.

DO YOU WANT TRADE IN EAST? HERE'S ANOTHER EXPOSITION

A Colonial Exposition in Semarang, Java, Dutch East Indies, September-November, 1914, is to celebrate the centennial of the return of the Dutch East Indies under Dutch rule after political affairs in Europe had been readjusted, following the defeat of Napoleon and his banishment to Saint Helena.

The Dutch East Indies, of which Java, Sumatra, Borneo and Celebes are the principal islands, have a population of over 30,000,000.

The sugar, coffee and other agricultural industries have been brought to the summit of perfection by the Dutch planters, the most modern machinery is in use, and transportation is provided by a complete net of railways and a large fleet of modern steamers for intercolonial and international traffic.

The growth of trade of these islands as shown by figures for exports and imports is impressive.

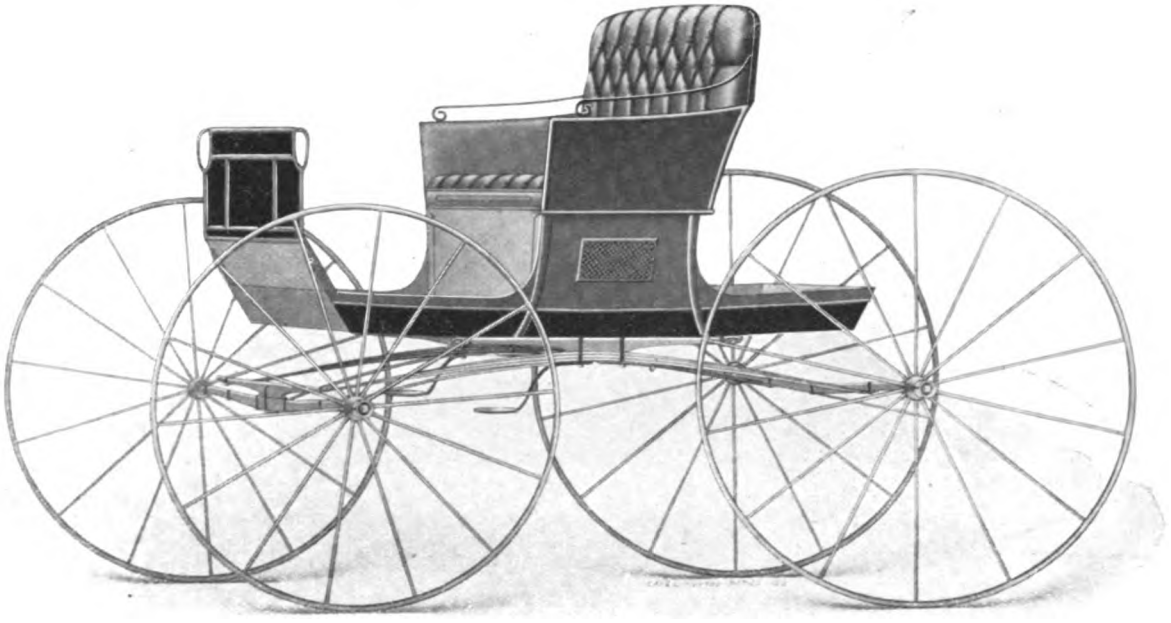
The exposition is divided into the following divisions: (1) Colonial Government; (2) Agriculture; (3) Domestic Industry; (4) Foreign Industry; (5) Commerce; (6) Traffic.

Representative for the United States is T. Greidanus, who has opened an information bureau at 136 Water street, New York City.

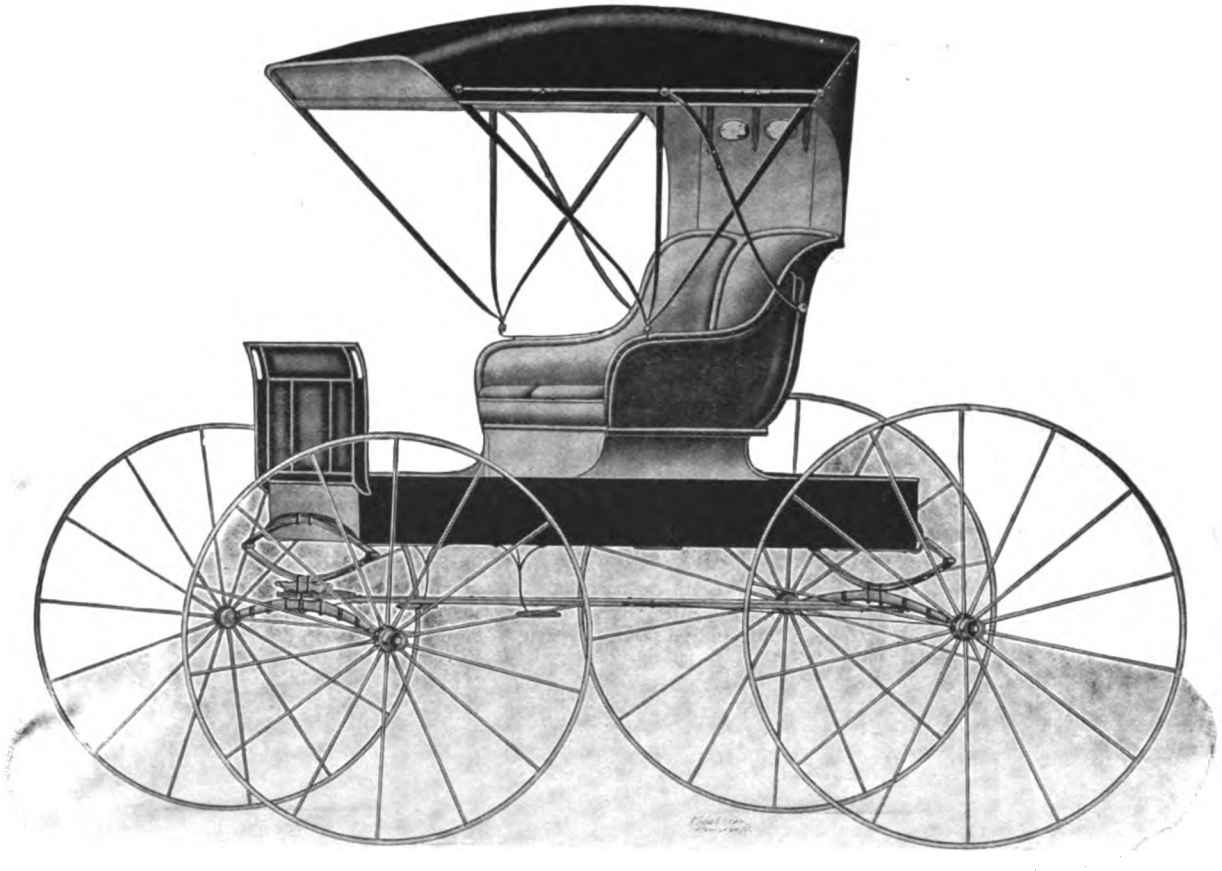
STILL ANOTHER!

Exposition at San Diego is now scouring this and other countries for exhibits. The exposition fever in California seems to be in its most catching phase.

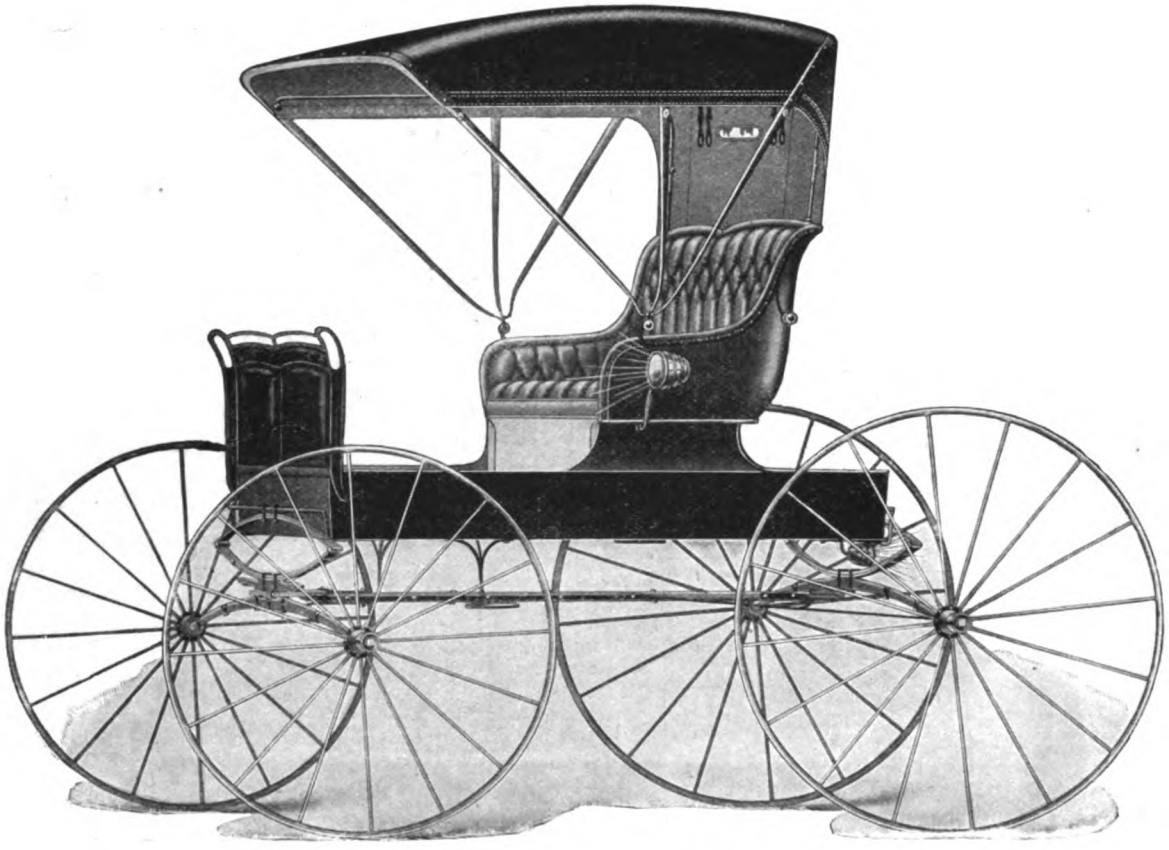
Sample Styles From Good Builders



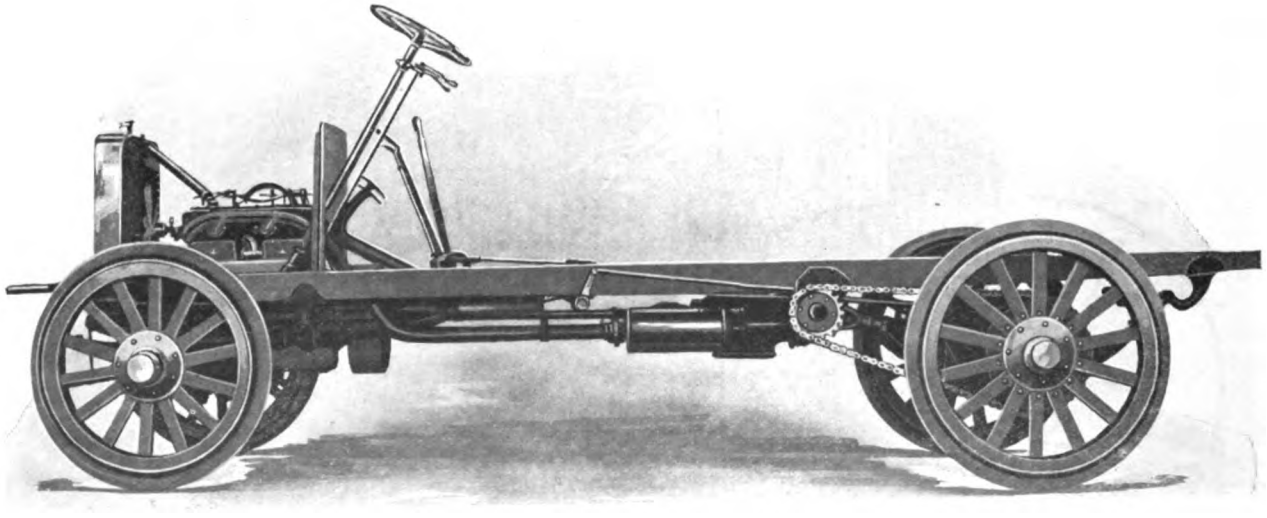
EUREKA DRIVING WAGON,
WITH STANDING TOE BOARD
From the Eureka Company, Rock Falls, Ill.



AUTO SEAT TOP BUGGY
From D. M. Sechler Implement & Carriage Co., Moline, Ill.

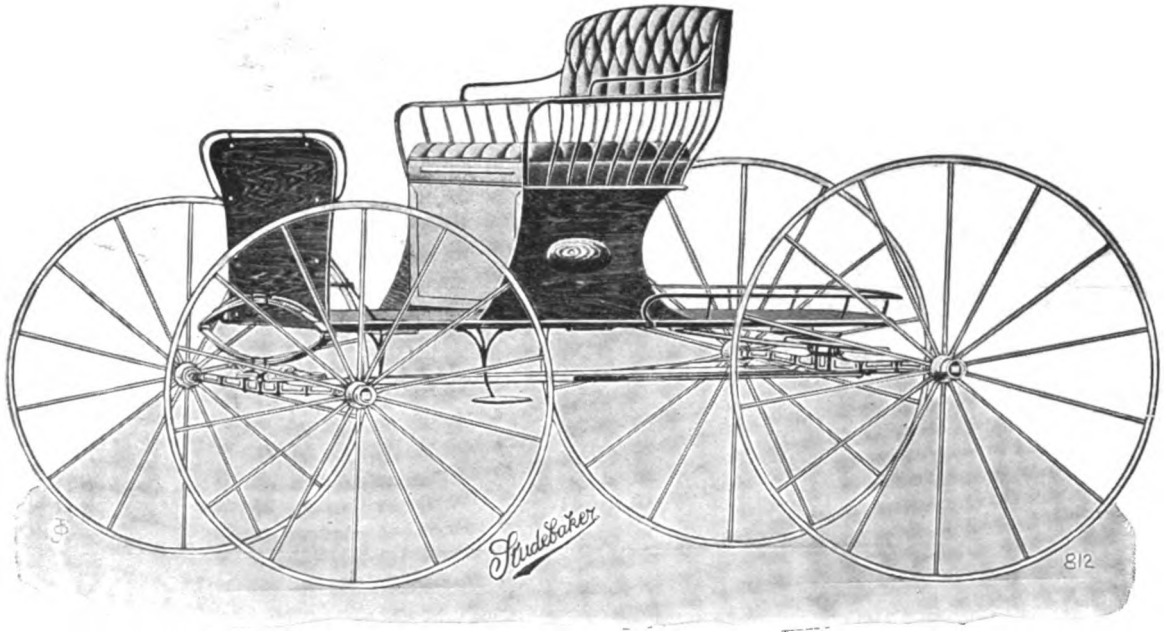


THE "IDEAL" TOP BUGGY
Made by
The Emerson-Brantingham Implement Co., Rockford, Ill.

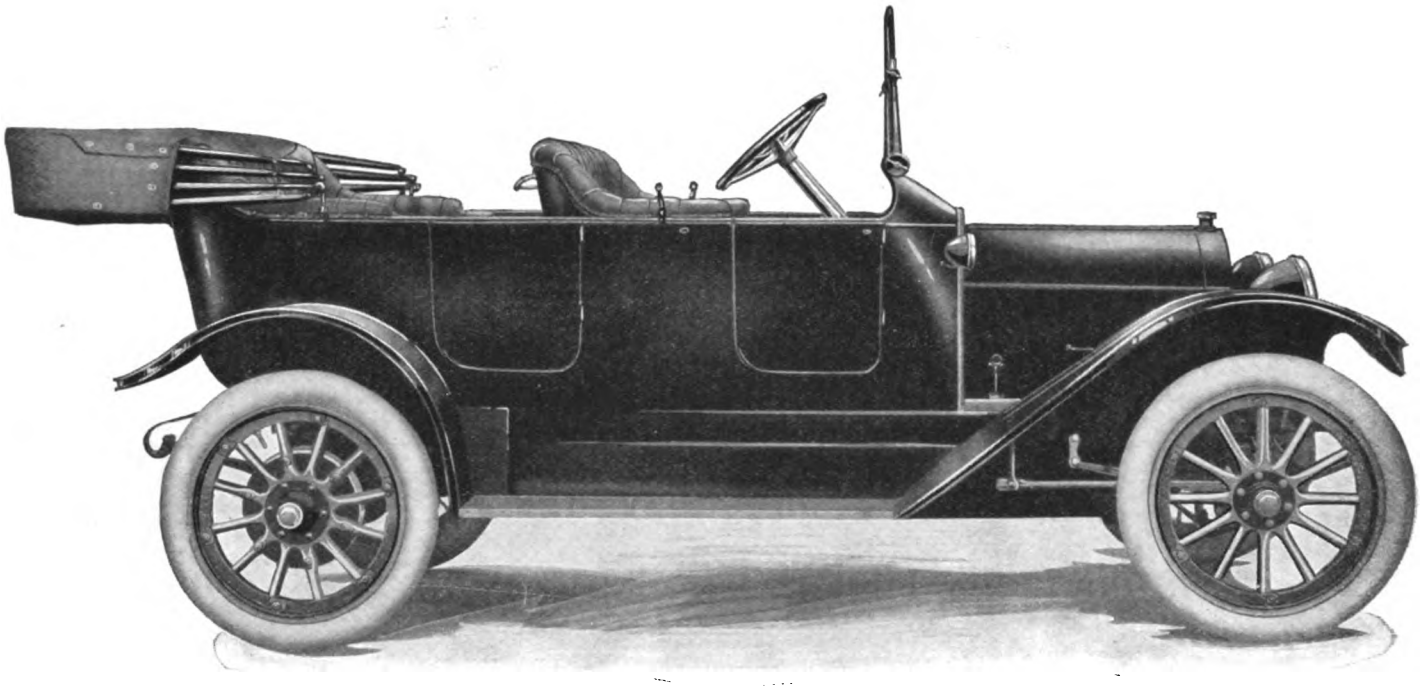


MODEL F TRUCK CHASSIS
Made by Corbitt Automobile Co., Henderson, N. C.

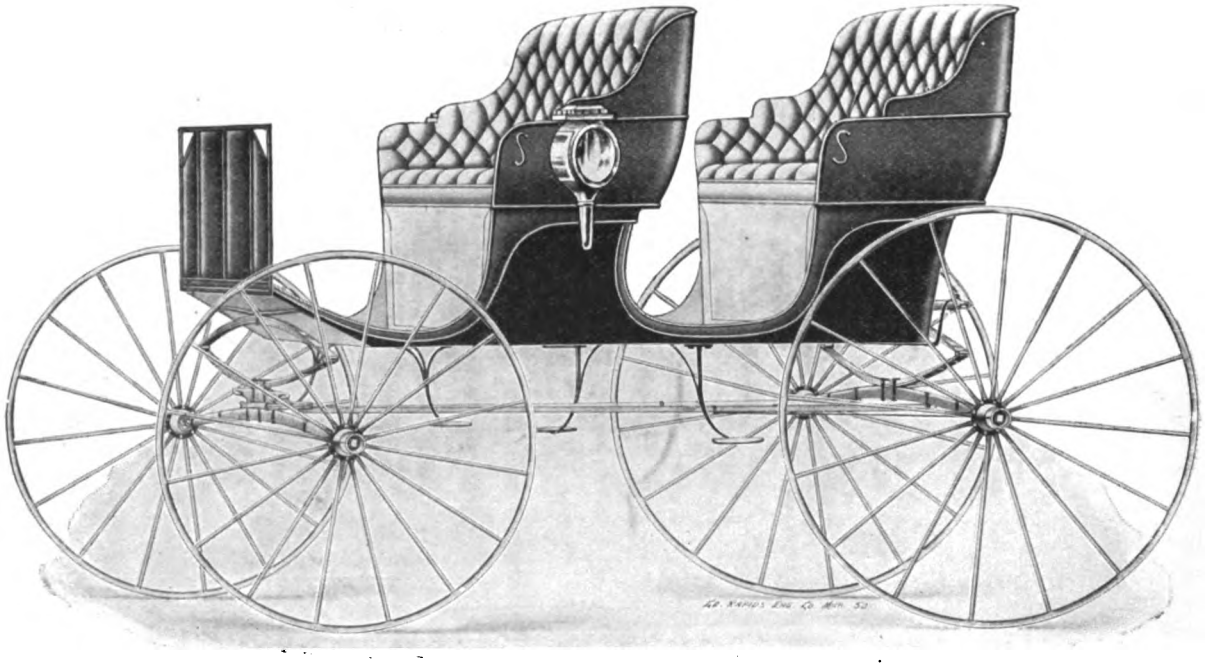
AUTO SEAT LIGHT DRIVING BUGGY
Made by
The Emerson-Brantingham Implement Co., Rockford, Ill.



STICK SEAT BUCKBOARD
From Studebaker Corporation, South Bend, Ind.



FIVE PASSENGER TOURING CAR, MODEL D 45
From Crow Motor Car Co., Elkhart, Ind.



FOUR PASSENGER DOUBLE ELLIPTIC SURREY
From Sechler & Co., Cincinnati, O.

SAMPLE STYLES FROM GOOD BUILDERS

(See Illustrations)

The Eureka Company has been very successful in building work of the "well finished kind," and the illustration will be interesting as a study of what the factory turns out.

The D. M. Sechler Implement & Carriage Co. are such veterans in the buggy business that any work bearing their trade mark must have its interest for dealers.

Two examples from the Emerson-Brantingham Co. are given. In one the "Ideal" top that the factory prides itself on is shown. The "Ebco" axles that have rolled so many thousand buggies into popular use is one of the features of the jobs shown in our illustrations.

The Corbitt Automobile Co., of Henderson, N. C., are represented by a Model F truck chassis. The company also makes pleasure cars. The Model F has many sturdy points, and it is a good proposition for wagon builders looking for suitable gears for bodies they are building.

The Crow Motor Car Co., Elkhart, Ind., is represented by a full finished five passenger touring car, known as Model D 45. Here is a moderate priced car that has more than enough good points to appeal to dealers who are looking for satisfaction to customers and profit for themselves.

The Studebaker Corporation work has always held its place in the esteem of dealers. The spindle seat buckboard is ever an attractive style.

Sechler & Co. are not behind the wholesale procession in good work well designed, and at prices that cause dealers to come again.

AS OTHERS SEE US

Impressions of a German Expert in Cooper's Journal

When we hear of the enormous output of an American body-building factory we arrive easily at the opinion that their management beats ours. This is true only in regard to the money-making aspect of it, as they call it over there.

In the largest and most important factories cars are only made in large numbers. Original or exclusive designs there are none. One can only get the same pattern in different styles of finish, and even in these the choice is limited.

Naturally, making cars in numbers like this, with the demand which obtains in America, the plant can be utilized to the utmost. It is also possible to set up special machines whose cost, for building single bodies, would be out of proportion to its capacity, but in existing circumstances the outlay is soon recouped.

In reference to art in car building, German and French makers are far in advance of the American; for, of course, in manufacturing on a large scale everything is eliminated which causes difficulty in manufacture. No alterations of design are allowed until all old material such as fittings, etc. (which are also bought or made in quantities) are used up. Of course, if changes are unavoidable it is endeavored to make them fit as far as possible with the previous designs, so that a minimum of new models and new machines shall be required. This only holds, of course, until the march of progress demands that body forms shall be completely altered. For instance, when the torpedo body became fashionable, the Americans only took it up after they had completed their season's output then in hand.

This is essentially in the nature of wholesale manufacture. It would be simply impossible to do it otherwise.

We must not forget, though, that America has quite a number of factories which execute scarcely anything but special orders or models. These embody all that is newest and handsomest, as would be the case in Germany. Most important of all, the wood there is of a quality we seldom use. In almost every case only the best ash is used for the frame of the body; this is tougher and better than German birch, and is found in astonishingly sound quality. Flaws are seldom found in the trunk—and there are no branches or knots. American ash is well known in Germany but it is necessary to be very careful in buying it, for owing to the logs lying for a long time in the open air the wood is often rotted and therefore partly useless. Besides, they don't send the best quality to Germany!

It is noticeable that they strive to the utmost to conceal all signs of joints or deficiencies in work by plating over. As plating makes less work, and the plating is of aluminum, this is quite comprehensible.

I saw a year-old French limousine car in New York, made by one of the principal firms (so it was not a question of inferior work), but almost every joint showed, and the varnish was almost ruined. Apparently it could not stand the damp climate.

In order that a European car may stand the climate successfully, the whole fitting together of the separate parts must be done carefully and conscientiously, as the influence of the variable climate on the different materials is very severe. The best means for meeting this point is to use only wood grown in the country for which the body is destined, for, according to nature, wood is suited to its country's climate, and therefore warping is less to be feared.

As far as upholstering and varnishing goes, the American maker is as good as his European rivals.

As for the factories, many are as good, some better, than ours. Most of them could be called standard. All the workrooms are roomy and light, and lie suitably for their object.

Smiths generally have to put up with the cellars or ground floor, as in Germany. Next to them, or above them, are the wheelwrights and woodworking departments; trimmers and painters are usually on the upper floors.

Some factories are four to eight stories high, and communicate by trolleys and lifts. All the material, such as wood, is bought in large quantities, mostly ready cut. Close to the wood rooms there is a drying room. The wood must lie five to six weeks, according to requirements, but the room is only occasionally heated and then aired, to hinder the wood drying too quickly and bursting and splitting. After the wood has been cut out in the rough and the ends dipped in glue, the whole thing is put back again into the drying room. The wood, you see, receives the greatest care, and this being the case, the result must be a durable body.

The logs are piled in the store room in the way we are accustomed to. Each log is marked and classified according to its age. The way the planks are hung up in the roof in racks is admirable. This method has the great advantage of showing at a glance the breadth and form of each plank, and allowing them to be taken without any difficulty.

In American car factories it is the custom that each workman shall bring his own tools. If he wants to be thought any good at all, he has a whole box full—is even expected to bring his own screwdrivers. There are no tool cupboards, so no one can lock his tools up. Behind, or on each bench a stand is built on which everything can be hung.

There are no machines kept in the wheelwrights' department. They are kept in a special room nearby, except such necessary articles as band saws, planing machines and perhaps tenoning machines, circular saws and grindstones. The woodworking department proper is, on the contrary, close to the wood store. Here are all the machines for working the wood in great quantity. Here also are the special machines. This department is the most important of all and indispensable for great output. Here every piece of wood is made and finished with all its holes, tenons, slits, grooves, etc., so that there is only the assembling and finishing left for the body maker to do. This is also piece-work in a measure, for one group of workmen make the front part, another the doors, a third the back part, etc., so that every section shall fit and no hand finishing work be necessary.

Everything is made from jigs, so that mistakes are impossible.

The preliminary work for these jigs is the most costly, but the outlay for the subsequent construction of the cars is comparatively small. This outlay of money and time is repaid by the increased output capacity. The before-mentioned jigs are used so that the bent and shaped pieces can be worked out accurately by the machine. The models have exactly the same shape outside as required outside or inside by the specified piece of work. The jig is made so that the wood must be laid in the exact position. To this end little blocks are fixed at each end of the "box," and an exact model shape is glued on. So, if the piece of wood to be worked is placed precisely on the model and secured with wood screws, it is easy to work out the particular part as desired, either on a little planing machine without table, or on a quick shaper. No mistake is possible, and it is a mechanical piece of work which can be done by any inexperienced workman. On nearly all the jigs all the holes and plugs are indicated, so they can be made at the same time without having first to mark off from a plan, as we do it. For each piece of work there is a special cutter to shape out every groove, etc., with the machine.

As already mentioned, almost all bodies are panelled with aluminum, and in some factories they do great things in this way. For instance, I saw a limousine body in the rough, with aluminum plating, on which not a single joint was visible. It goes without saying that a thing finished like that would stand even the wettest climate.

The method of securing the upper sides and back panels, which is sometimes used, is highly interesting, and may be described as follows:

After the lower panel plates have been nailed on, the upper ones should, of course, cover all the joints. With this object, first of all an iron frame is prepared, around which the upper plate is turned, and the frame, from the inside, firmly secured to the lower plate by screwing to the iron frame. Of course much skill and time is required for this work, and so it can only be used for expensive cars.

The closing of the side and back windows is as follows: The aluminum plate is nailed to the window frame, and to hide the nails, false grooves, which are made of cast aluminum, are screwed on. These are provided with bosses through which the holes for screws are bored. After the screwing on, the screwholes are riveted over, with the stuff left over, and are then neatly filed. These places cannot be seen on the rough body, even when looked for. The whole door frieze is, like these windows, made of aluminum castings. In the first place it gives the door solidity, and then that kind of molding can never break loose or partly spring off. After the riveting of the holes, there is absolutely no screw hole nor trace of the manner of fastening to be seen. Outside, the body thus aluminum-plated, looks as if cast in metal.

The roof of the body is generally made of three or four-ply white wood or mahogany.

Smiths usually work together in one room, while the tinplate working department is separate. The tools in use are generally similar to those we have in Germany, with exception of the forge, which is not built like ours. All the smithy fires are quite open, entirely of iron and provided with screen and ventilator. A German smith would not like to work at such a forge. There are numerous little gas furnaces for small parts such as chisels, punches, etc., so that useless waste of coal is avoided when a large fire is not needed.

Drilling machines, mechanical hammers, polishing machines, etc., are usually of the same construction as our own.

The working of aluminum or block tin for the bodies is interesting. As everything is made in quantity, exact templates are prepared, and the material cut out in large quantities. The hammers used in the shaping are driven by power: this is very practical and appropriate. After a body is plated, it is put in the sand-blast room, and after being subjected to a spray of sand and compressed air, the metal looks polished, so that emery polishing by hand, which is a great waste of time, becomes unnecessary. In this room, too, old bodies are freed from the old varnish by the use of the sand jet, so that the nuisance of burning it off belongs to the past.

The body painting and varnishing is almost exactly the same as in Germany. Of course the American inventive spirit always seeks the aid of machinery. For instance, there are enamel ovens, where, besides fittings, entire mudguards can be baked in colored enamel; this method has been, however, long known in Germany, but is hardly ever made use of in car or body factories. A machine which automatically paints wheels must be very interesting. First there is a large barrel of the desired color, above this a stand with a revolving disc, to which the wheel is attached. Then the disc, by means of a lever, is dipped in the paint, and brought back to its old position and is revolved quickly by an electric motor so that all the superflous paint from the wheel flies off and falls back into the paint box again. The wheel becomes dry in a few minutes on account of the tremendous current of air.

As to the quality of the painting, it can be called absolutely first class, and so even the less expensive cars have excellent finish.

As to the inside fitting of the cars, it is much the same as ours. Usually the finest trimming materials are used, but in the cheap open cars much pantasote (imitation leather) is used. Those firms which make bodies in large numbers have tried to cheapen their productions in the trimming department by having special machines, such as cutting-out machines, upholstering machines, etc., while almost all the sewing machines are power driven. But, as before mentioned, such machines require large output to make them pay.

The best car factories in New York, which make almost exclusively to special orders, are usually no different from ours. But because of the high wages, work is here extremely dear, so that the selling price is most extortionate, viz., $2,200 to $2,500 for a limousine is the usual price. Luckily there are millionaires enough who can and do pay for such special factories to exist, and even for some of them to employ 400 workmen.

As from the beginning, the motor industry in America started in a comparatively large way, such a number of experienced wheelwrights were required for it that many of the firms were in difficulties. Particularly because good and experienced body makers were few in America—at any rate, not as numerous as in Germany. To cover the deficiency in these workmen, the ingenious American discovered several alternatives. One decided to cast the bodies in aluminum.

Perhaps many people would think that the body is cast all at once in a mold, but it is not so simple. It is, in fact, made of different sections, cast separately and put together. Open as well as closed cars are made of cast aluminum by the firm in question. A phaeton car is made of the following parts: One front seat back panel, and one back seat back panel, two side panels, three doors, two halves of the dash. The same order is followed in the closed cars. These parts are cast rough and are then fitted together and attached to the main frame. Arm rests, door posts, and door frames, are all made of wood and plated with aluminum.

The body is designed just like a wooden body, the hinges and bolts and such like fittings are the same. The design is not new, but only the method of construction. In reply to my question if this construction was cheaper than the ordinary, I was told that the contrary was probably the case, because there is a good deal of hand work connected with it. They were forced to introduce this method on account of the before mentioned lack of suitable wood workers.

MEYER THREADS

John C. Meyer & Co., Lowell, Mass., are the thread and silk merchants of the vehicle trade. They seem to have what the trade finds it to its interest to use.

COL. BAILEY'S PILGRIMAGE

Story of the Trip from Boston to Chicago in the Bailey Electric Told by Col. Bailey—A Record Performance—An Interesting Account that C. B. N. A. Members Will Enjoy

The embarrassing thing about the story of this trip from New York to Chicago is, that there isn't any story to it; it doesn't amount to much, there is no local color to it. If I can give any color to it, it will be a story of troubles, and the troubles on that trip were tedious drags and not humorous incidents, nor sporting incidents.

This Chicago trip is only incidental to our business. It seems to have interested other people more than it did me at the time. We wanted a car in Chicago, we had a business purpose for having a car in Chicago. There was a business convention there and I wanted to go, and I had just been up through the mountains; it was somewhat of a trial trip. I had gone in my car up through the White Mountains and the Green Mountains and across them once or twice, and that trip to Chicago was just incidental. I expected to have a nice trip out there myself and pretty near intended to take as a companion my wife instead of an electrical engineer, but I am happy to say I didn't. It was purely a business trip and I intended to go straight through—out through Pittsfield and Albany, and had it laid out we could go out there in five days and allowed seven for it. That car I went in was a two-passenger roadster car, and instead of having time to work it up we took a brand new car that had never been tried yet and the electrician looked the car over and said he had the last thing ready, so I rode it home every night and brought it back again in the morning, a matter of three miles; and took it along the testing course to see if the electric testing connections were right and the controller, and finished up a little business and went to Boston with it and started that night on my trip; so, you see, there was no special preparation. It was folly to undertake any stunt trip with an untested car; it happened—and I think really fortunately, we had no right to expect it—that the matter of taking a new car didn't hold us back at all, nothing happened to the car at all; but the battery was a little handicapped in some ways. We had a little 60 A 6 Edison battery, and as it was not thoroughly developed we didn't expect it to come up to the best performance until it had been charged and used a little.

Now, I started to New York with a brand new car. We gave it one charge at our factory in Amesbury, a partial discharge going into Boston, then we had to go out that night, starting for New York, and didn't have a good charge again for some time afterwards. Nevertheless, we stayed some four or five days at the show and then it began to rain. It rained the night before I decided to start for Chicago and it rained every day I was out until the day I got to Chicago and we got the heaviest rainfall of the year. I had no intention of going through as a matter of publication, but having started with publicity there was nothing to do but to go along. If I had discontinued the trip somewhere at Buffalo they would not have said that Bailey hadn't sporting blood, they would have said the car was no good. It rained all the way and there was nothing to stop us and nothing did stop us, but it interfered with mileage and speed and the distance on one run was a particular thing we would like to talk about for the public good. People always ask some question about this; for instance: "You went to Chicago but you didn't do it on one charge, Bailey?" And the next person seemed to have this bug—that the limit of the electric car is what you can do on one charge of the battery, and the next one said: "How long a run did you make on one charge of the battery?" I never thought of trying it, I didn't consider trying it. "How long a distance did you make in one day?" Really, if there had been good conditions I should have tried to go a long distance in one day. And they wanted to know what speed we made. As a matter of fact, the whole distance was about 1,202½ miles, something like that. In order to have some proof I took receipts from garage to garage, from my hotel to garage, from point to point, so that we could have some proof that we had been over the route and necessarily absorbing all signs of all kinds in between. Now, the whole route, the 1,202½ miles, including all stops, we made in something like 16 7/10 miles per hour for the whole 1,200 miles from Boston, but that included some long stops, such as getting arrested in Hainesville and going to court and taking two and a half hours out for that. But that is really no test at all of how an electric car can go. But allowing for those particular stops, taking out an hour for luncheon, this going to court and getting mired, we really did make 17 8/10 miles an hour average running time. The first figure, 16 7/10 miles per hour you don't have to take my word for, because we have receipts for that; but taking out these other stops, we made 17 8/10 miles an hour and that included all the ordinary stops, such as looking at the sign boards, waiting at railroad gates, inquiring the way and going through villages and towns; so that is the total stop distance for that speed.

Fourteen Days on Trip—Lowest Mileage, 18

Now, on the miles per day, the shortest mileage (we were 14 days on the trip) was when we made but 18 miles from Albany to Schenectady. It isn't a very good thing for publication you see, but in Albany we left the car for charging at night and we came around the next morning and found it was not charged at all, so we practically lost that whole day hunting up a garage. The next day we got away from Schenectady to Syracuse, 173½ miles, I think. We went up the Mohawk Valley against a strong westerly gale, with rain squalls. For over three-quarters of an hour the rain would come in and shut out the whole landscape and beat us down and the sun would come out and then it would rain again; and on that particular run we went through four and a half miles of construction up near Fonda. Two and a half miles of this road from Schenectady was perfectly open construction, dug open, full of mud and rocks and deep culverts, and I didn't know how any car would get through it; I never expected to get through. Our best speed was made, I think, perhaps between Boston and New York, and that will lead back to a continued story. We left Boston early in the morning, having no idea of trying to see how far we could go on one run, but simply to make a good run there, taking power just as we could get

it, just as anyone might. We left very early in the morning and stopped at a little lunch place in Worcester to have some Boston baked beans and while I was there I did put the car on charge at Worcester at 90 ampere rate, and we went on to Springfield on a northwest gale and we made 21 and a fraction miles an hour to Springfield. The car was charged at 100 amperes. Now, in the hour and a half that we were eating our luncheon, I got back pretty nearly 90 per cent. of the power we used. This is the point the public doesn't understand—that we got nearly the power back; they think we must wait all night; and we ran to New Haven at 23 6/10 miles an hour. It happened that the current consumption on that route was the lowest of the whole trip, so that there is an illustration of this matter of how far you can go on one run; but at the rate of power consumption that we used going from Springfield to New Haven at 23½ miles an hour, on a battery of 260 ampere hour, you can run on and make 107 miles on one charge at that speed. That is an indication. I am speaking of that intimately for our own information and knowledge. Probably at 20 miles an hour we could go very much farther, but we made good road speed and did it easily. I tried to make good running time, but we got lost around Norwalk and vicinity. All stops, including going from garage to garage, taking our time when we got in the garage and before we left the garage, clear to New York City down to 76th street and toward Battery place we made 21½ miles an hour average running. It was a good run under those conditions and those conditions I expected to have in going to Chicago.

On leaving New York for Chicago it rained the night before. We made our first run to Schenectady, 76 or 78 miles and struck better going that I expected. We had fine roads, as a matter of fact. Well, we lost our way in Yonkers and above there at Cold Spring and a lot of the rest of the road was worn macadam, and it was all wet and sticky, and there was a lot of little pitches and hills, etc., so that we had a struggle to get into Poughkeepsie, but we made it all right. There the Central Hudson Co. was all ready to give us a good boost of 100 amperes if we wanted it. We charged and took the car out for a while and had it photographed and showed off a little and then went back, so that we really spoiled that afternoon at Poughkeepsie and the result was, we had to run to Albany, 78 miles or so, after dark in the rain. At Schenectady we had the first good charge the battery had. Up to this time it had been boosts, or an insufficient slow charge. Even in New York before we left, we had the car so long in the show that we didn't get a good charge; so that Schenectady was really only the third charge this battery had had. At Syracuse we spent the night. The next day we ran to Buffalo, going to Geneva where we took a boost. That is where we struck our first real bad unimproved roads; but we went to Geneva where they were all ready to charge us, and we ran over to Rochester in the afternoon. At that point we made just under 23 miles an hour; there were some very noble hills between Geneva and Rochester. That afternoon it didn't rain. We had to leave Rochester in the evening. It was raining in good shape and we made a run of 77 miles to Buffalo after dark, along a strange road—fine road and straight road—and made about 20½ miles an hour. In Buffalo I spent the afternoon on business, and in Buffalo what good luck we had was all stopped. It had been raining every day; it kept on raining. Ten miles out from Buffalo we went into mud, just like going into mud flats. It was a clay road when it was made; it might be a very good road, but a clay road after a week's rain is a rather bad proposition, and an altogether new one to me. I intended to go from Buffalo to Erie on one run; it was a good road. We had to charge on the way at Fredonia and at Dunkirk. We made the run in the evening to Erie and through some very deep river valleys and some very soft clay roads, and this was true all the way through.

Roads So Bad Thought They Were "Back Alleys"

We got into Erie at 10 or 11 o'clock at night. I absolutely didn't think I was in a road at all; I thought I had gone down some back alley. I saw a man on the sidewalk, and I asked him if I was on the road. "Oh," he says, "this is the Buffalo turnpike; only a mile or two more." We were right in the city of Erie then. I never saw an old-fashioned hog pen as bad as that. We spent the night in Erie, and while there was an electric garage there sufficient for most purposes, we had some difficulty in getting high enough rate for a charge. They put us on 40 amperes, and I needed 45, and we didn't get away until 9 o'clock in the morning. I believe that was our worst day. It was raining, pelting, pouring rain. I put the cloth up at that time connecting with the wind shield, and we plugged along 46 miles to Ashtabula through a clay road, against a head wind and pouring rain, with shrieking gusts of wind and the water splashing over the top like the bow of a tugboat, clear over it—couldn't see through our glass at all. We plugged along and struck another experience there that was strange to me. I knew that we had got into a more level country and wasn't looking for this piece of road, but it was a river bottom where all the rivers go out to the lake. They have made, as it were, a canyon through it to the lake, and you come down 50 or 75 or 100 feet (it looked like a thousand to me), and you slip and slide down to the bottom and get across the creek, and then you have to climb up through about 20 to 40 feet of blue clay in the canyon. Between Erie and Ashtabula I think there are four such river bottoms, and that puts current consumption, and "How far can you go on one charge" out of all consideration. And it is a crime for any fellow running any kind of a car. As a matter of fact, they don't run the other cars very much. On that road I looked back one place and there was a big touring car following, the only car I saw that day that had the temerity to be out, and I saw this fellow a quarter of a mile behind me, and I was looking for some place to pull out and let him go by, and it was half an hour before he came up to me—but I was going over 30 miles an hour myself, and he was not going any faster than I was. I did find a place half an hour later, and I saw it was a little firmer, and I pulled out and let him go by.

We pulled into Ashtabula, and the charging facilities there were curious. There was no municipal lighting plant; there were objections to the industry there; but the manager of the A. B. C. Company was a charming fellow, and he said: "Sure, I will take care of you"; and he said, "We will charge you if you can take it." We took a charge direct from the exciter without any rheostat or resistance at all. The a. c. generator was a 1,200 generator—big, horizontal engines connected to it, all bolted down to the floor. In order to give a charge to this little Bailey runabout he had to run those 1,200-watt engines, and the whole blooming business, too. He was certainly a Christian—he started that thing up. I thought, "If I could only take out this side of the house and take a snapshot of these great big engines driving that big thing and charging my little car outside it wouldn't advertise the thing to the public as a whole, but it would be a joke to us, you know. But I took about 100 amperes. Unfortunately, the night load came on so I couldn't finish up. I started out to go to Erie; I hated to own up that I didn't have enough, you know.

I thought about the road from Erie, and I started to go to Cleveland, 50 or 60 miles more, and my courage failed. I decided I would stay over night and finish up in the morning. So I did, and I lost a whole day. The road out of Ashtabula was worse than going into it; I have a picture of that, too—not the worst of it, but some of it—a little construction going on, blue clay mud, terrible shape. So when I got into Cleveland I noticed that the car was all covered with mud. When I went into the Carlton Hotel I met a business man of my acquaintance, and he asked me where I was going, etc., and he came to the door to look at the car. "By- thunder! You couldn't tell the color of that car if it weren't for this place in the axle where it is washed out there; it is blue." And it wasn't—it was red. We had gone through the mud so com-

pletely that this disinterested man couldn't tell the color of the car. It was a case of getting by and getting along, and getting away with it. I found they didn't go with gas cars over this route, and there was only this one car from Ashtabula that I spoke of between Erie and Cleveland.

I stayed over in Cleveland a day and talked with the Automobile Club members there—a very nice insitution. Mr. Keeley was the secretary; he was good to me, and I asked the way to Toledo, and he said, "Automobiles can't go through Sandusky the way you are going. You must go around through Norwalk; there are two roads around through Norwalk. I just went over those roads last week in a gas car. We were nine hours going 40 miles over those roads, and I should tell you you couldn't go that way. If you got here from Buffalo over that route you must have some different kind of a car than we know about."

Trip Was From Hole to Hole

We made from here a run to Elyria of 20 miles; there was a good road, but we ran into construction there and I got mired for a second time. We got out under our own power by putting stones under the wheels. We were mired once or twice before and came out under our own power each time. From Elyria to Norwalk it is 32 or 33 miles; it is actually 37 by the map, so that we made 32½ miles at 140 amperes per hour, and that was over the road the gas car went 40 miles in nine hours, so I didn't feel as bad about that, but we struck a river bottom there, a terrible place, and we were towed into Norwalk, and although I was really sorry to be towed in, I do not feel that breaks the trip at all (about a mile and a half). I couldn't get there. I had used up my power, but I had been about 4½ miles further than the road measured. The garage couldn't charge me, and I ran down to the central station and went right on the exciter and got a little boost—a good little boost of 100 amperes in a couple of hours; and instead of laying around the little town at night we ran up to Fremont that evening on a macadam road. I went on to Toledo, over worn bad macadam road; the macadam was pitched and all full of mud and holes. We struck a charge at Toledo, no trouble at all, got any power we wanted, and got fixed up ourselves. We left there that afternoon and got into real trouble after that. The main way out was under construction, and a way west we struck a little flat, like prairie, no gravel road whatever; ten miles out a fine state highway, and then right off into the mush; it isn't a clay road, just soil, and just before we left this road they were putting in a concrete bridge, and there was a detour down to the bank right over the railroad, and I knew we could go where a gas car could go, and I put my headlight down and saw a car had gone there—all clay down there—and I slid down in, and just as soon as I got down in we settled back and the wheels spun around. That was the only place I had to be pulled out; I had to get horses to be pulled out of there. It wasn't that we didn't have the power, but couldn't get traction. It was pretty lonesome, I can tell you. It was raining, and about 9 o'clock at night, and we plowed around in the mud with flash lights, and saw the temporary culvert where we went over, and saw plank enough, but we could not get chains on the car; there was no foundation for a jack at all. Well, as we were figuring that, an old farmer was coming along; I thought it was a watchman coming to tell us we couldn't use his plank. "Pretty hard to get stuck," I said, "to come from Boston a thousand miles out here and get stuck." He said, "That is all right; you have as many friends out here in Ohio as you have in Boston," patting me on the shoulder; "you have just as many good friends here as you have in Boston; I will look out for you."

Finally "Dobbin" Had to Come to Rescue

He went and picked up some plank and tried to get some of it under the hind wheels, and couldn't do anything, and he says, "Guess you will have to get a team to yank you out," and that was a fact. And I said, "Yes, I guess so, if I knew where there was one." "I got one." He was a good friend. Isn't it funny, though? The old cuss was hanging around there; he had been getting out seven and eight or nine automobiles every day there. When he saw my headlights down in there he chases down a half mile in the road with his lantern to see the next victim. That wasn't all the joke, but the next joke was on him. I knew I was stung pretty bad, but I had to get out, and I says, "All right. What will it cost me for being yanked out?" I didn't know what he was thinking of, $15, or $25, or what it was, and he hung around and spit tobacco juice a little, and he said: "I will have to charge you a dollar." So I waded around and got off the engine in two minutes, and said, "All right, go ahead." That was the only humorous incident of the whole trip. Then we had about 25 miles of old mush, and the roads ran along section lines and a mile or two straight ahead, and then you turn two or three miles that way, and turn a little this way, and in all directions over the whole map, and if you go by the turn you ought to make you are lost, you are right off in the ocean somewhere. The farther I went that night in the rain and muck the more worried I got about it. There was nothing to indicate the main road, and it was with a sigh of relief when I came out at Ocean, O., that night. It was a fine little town, and they had a Great White Way, a fine paved street about a quarter of a mile long, with gold lights posted the whole length of it, with three arc lamps, all lighted up for a Great White Way, and there were about four people in sight, but they looked good to me. So I said, "I guess we will stop here." I couldn't bear to leave that oasis.

The next morning I went on to a little German town of 500 people. The central station there is run by an oil engine of 50 horsepower. The generator was 250 volts, so I put that right across my battery, and I couldn't register but 100, and I judged somewhere from 150 to 200 amperes would be a fine boost to go on with, but his plant couldn't stand it—the first time I had ever hooked on to a central station that couldn't stand what the battery could. We got a washtub out and an old parlor stove and got a fine boost of 150 amperes, and went on our way to Kendalville, Ind. At Ashtabula, I ought to say, there was an incident there regarding the roads. While I was waiting around there an old German came along, and he came in to buy a motor or something. He asked what kind of a car it was, and I told him it was an electric car, and he said: "Where did you come from?" And I said, "Boston." And he said, "Pretty bad roads, ain't it?" And I said, "Yes." He said, "You did well to get through; I have sold ladders in this country for twenty years, and this is the first week I couldn't get out." That was a pretty good remark.

When we struck the Indiana line we struck gravel roads. Of course, they were not any too good after all this rain, and we began to get the hills then. I shook hands with the first few hills I saw, they looked so good to me, but going into Hainesville they got pretty heavy, like those around Yonkers. I never forget going into Connelsville; the road goes away from the town about five miles and winds around and comes into it; I thought I was in the town about a mile, and we were about an hour coming into it. They had a good charge there in the day time, but not in the night time; and the manager of the central station—a good manager often has to accommodate—stood up everybody in the town, and finally we were charged at the power station of the street railway company—the first time it had occurred to me; and the street railway company gave us a fine charge that night, only we had to wait around for it. The next morning it snowed. I woke up early, and we got breakfast, and went to Goshen, and the manager there was a very charming gentleman, and they gave us a good charge, and gave us luncheon, and we went on through Elkhart to South Bend. The roads up through Elkhart were as much as ten miles of paved road, the rest of it fair. At South Bend we could have gone on, it was only two o'clock in the afternoon, but I had relations there and a good many

friends, and I stayed over at South Bend and had a nice time, and went on in the morning. Then I thought my troubles were all over, and I had the vague idea there of running through to Chicago, for the battery was pretty well worked up. I thought I would make that run and make it in one run, but barring the road to Ashtabula this stretch of road from South Bend was the worst we struck, in some ways. Right from South Bend, a city of some 60,000 people, on the main road it was awful, full of muck with deep ruts, and the only time in the whole trip that I even looked at my motor was on that stretch of road. We pulled along drawing over 100 amperes through the 37-ampere motor, 5½ ampere load per car mile. We got out on some solid land somewhere, and I got out of the car for some purpose, and while I was out of the car I thought I would look at the motor, and the insulation had just started. That was the only time in the whole trip I had looked at the motor at all, and I happened to look at it about the only time I should. I guess with half an hour more of the same thing we would have had to have another motor. We waited about half an hour for the motor to cool, and went on our way.

At Southport we had an emergency charge from a sawmill, and had a fine run to Chicago. We made those 77 miles at 19 miles an hour to Chicago, including very serious delays. There was a very good road from La Porte, 77 miles. In Chicago we got lost and had a terrible time there. We stopped at the Highlands, and instead of following the boulevard through we explored all South Chicago and East Chicago, and from 5 o'clock until 8 o'clock did some 20 miles of exploring in the worst part of Chicago. We followed trolley cars up over bridges, creeks, and down to the lake, and landed in Chicago without any accident to the car. As I said before, we got in at 9 o'clock at night.

The next morning we went around to the Commonwealth Edison Company where Jones and some of the officials had arranged some little reception and gave me a nice lunch. They thought they would have a picture taken in front of the station. I went really 1,500 miles from the time I left, and I sent around to have the car brought so that its picture could be taken, and he slid across the street and broke the hind wheel. Now, just think if that had happened a day before on the road, it would have broken my record. Just like a man climbing the Alps, you know, and then breaking his leg over his own doorstep. But we had the picture taken; that made the trip.—Reported by The Central Station.

LOCKING HORNS WITH THE RAILROADS OVER DUNNAGE

Railroads operating in southwestern territory are seeking to add to their revenues by collecting a charge for dunnage used in the transportation of automobiles, agricultural implements and other commodities, according to charges made recently at a hearing before Special Examiner George S. Gibson of the interstate commerce commission in the federal building, Chicago.

The respondents in the proceeding are the Rock Island and other lines affiliated with the southwestern tariff committee and the complainants include the National Implement and Vehicle Association and a large number of automobile manufacturers. The railroads, it is contended, have made a free allowance for many years of 500 pounds for dunnage, which consists of material used in bracing automobiles, agricultural implements and similar articles of freight in box cars. A notice was issued by the southwestern tariff committee last December that this allowance would be eliminated and a protest was made by shippers to the commission.

Will Increase Charges

"This allowance has been recognized as proper for many years and if it is eliminated the freight charges collected from shippers will be greatly increased," said W. J. Evans, freight traffic manager of the National Implement and Vehicle Association. "The dunnage material is provided by the shippers and is used to protect both the railroad and the shipper against loss through damage to freight. The carload rate on agricultural implements from Chicago to points in Texas is 85 cents per 100 pounds and if the dunnage allowance is discontinued it will mean an additional expense to shippers of $4.25 per car."

R. C. Fyfe, chairman of the western classification committee, testified that an allowance for dunnage places a premium upon inferior packing and amounts to a discrimination against shippers who pack their goods in boxes or crates.

HOME-TOWN-ASSOCIATION OF AMERICA

Editor The Hub: There has been for some time a feeling in the minds of a great many of our citizens that there should be a closer co-operation between our merchant and farming population. The best minds in the country realize that it is one of the most important questions now before the American public. Already in many parts of our country some work has been done, and it is proving of great benefit to the city, town and country.

We believe you are interested in a national movement, now organizing in Chicago which aims to improve the business and social life of the town and country.

The plan proposed is to create conditions in the towns and in the country that will keep the boys and girls contented and prosperous by making their life work profitable and their environment attractive. To accomplish this a campaign will be made to inculcate home town sentiments, based on real commercial advantages that will hold the home patronage and attract the country trade; and to add such features of education and recreation as will make town and country life enjoyable and helpful.

We are advised that some of the trade papers have already taken up this subject and are pushing it through their columns, having for their slogan, "More Business for Legitimate Merchandising, Better Conditions, Happier Homes and More of Them," putting upon a more solid and firm foundation the commercial as well as the social life of our country—strengthening patriotism, if you please.

We believe you are interested in such a movement.

How do you like the proposed name used on this letter?

H. T. A. of A.
W. A. Gardner, Sec'y,
722 First Nat. Bank Bldg., Chicago.

COST AND TIRE TROUBLE

The president of the Franklin Automobile Co. says: "Cost and tire trouble causes nearly everyone to travel by other means."

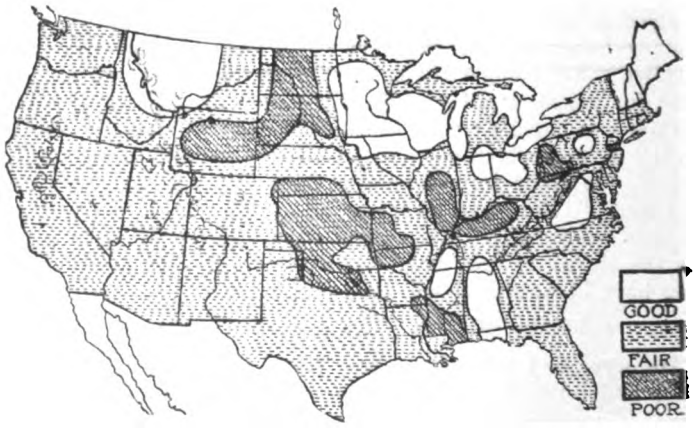


Diagram Showing Business Conditions

THE PRAISE AND GLORY OF THE ELECTRIC VEHICLE

(Paper read by C. P. Steinmetz before Electric Vehicle Assn.)

Today automobiling is still essentially a sport, and for this purpose to most people the gasoline car appears to have the advantage of being capable of higher power of motor, therefore higher speeds, and to go longer distances across the country without requiring charging stations.

You have heard from Col. Bailey's talk that the electric automobile is equally capable of long distance touring and that even today you can make shift by getting charges, and it is only a question of organizing a system of charging stations all over the country to make the electric touring car equally capable of going over long distances and therefore more suitable for this purpose.

However, it is not this in which I believe the main use of the automobile lies, because as I said before, it is still essentially a sporting proposition. Eighteen years ago we all thought the bicycle had come to stay as an every-day utility, as a business conveyance, still it is banished for this purpose; we don't go to work on the bicycle any more, but use another conveyance. Nevertheless, the bicycle is today used just as much as it ever was used, but now it has become a business conveyance. You use it where you want to cover some distance most conveniently. It is my opinion that very much of the present use of the automobile is of the same class as the use of the bicycle 18 years ago. It is the thing to do—everybody who can afford it gets an automobile and runs an automobile.

Driving an engine through the streets of the city is all right for sport, but it is not feasible when the sporting idea is mixed with every-day occupation, any more than you drive your own horse except for sport; though today when you attend any meeting of people that own automobiles and begin to speak about automobile matters, they all can intelligently discuss them and they get very much interested talking about carbureters and spark plugs and ignition devices and so on, just as 18 years ago the same class of people were capable and interested and could as intelligently, when you mentioned the subject, talk of chain-drive and gear and bicycle tires, single tires and double tires; but that is really outside of the natural inclination—is a temporary condition of sport.

Already today we see the automobile beginning to recede from the sporting attitude. We see many people that can afford it not taking pleasure in driving their own car but having a chauffeur drive it. But the majority of people cannot afford a chauffeur and they must either abandon the use of the automobile altogether or drive their own car.

I believe that the gasoline engine, while it is very simple and very well developed and will still be made more simple in the future, it is still an engine which is not such that the average business man can handle.

The beginning of this change of the automobile from a sporting-pleasure vehicle to a business vehicle, not the pleasure of going itself, but going for business, going to some place with a definite object—has already come.

The only car which will remain in general use is the car which everybody can take care of because it does not require any care; that means electric and the future of the automobile as a business vehicle is the electric because it does not require any special knowledge, any care. The electric automobile may be and is capable of doing all that the gasoline car can do, but I believe that, just as 18 years ago we have seen, on a pleasant Sunday, thousands of bicycles going all over the country—all have vanished—likewise we will see automobiles very largely vanish from touring. The automobile is all very well, but when you wish to go for hundreds of miles the Pullman car is really more comfortable.

The automobile carriage development is an electric carriage for every-day use. We do not need mileage of 100 miles or so. The every-day use of the average man going around town is possibly 30 miles. You see what that means—you can get a very small light battery and a light carriage.

There are many expensive gasoline cars used, but still with the majority the simple carriage is what is needed. True, we have the horse and buggy, but the average man cannot afford a horse and buggy, because it requires care and attention to keep a horse and you cannot keep it in a city without great expense. But he can afford an electric carriage, because it requires no attention and there is the main future for the electric carriage—it makes the owner independent of trolley cars, independent of railroad cars and allows him to go anywhere and everywhere; and that will be, in my opinion, the main feature of the automobile in the future when the condition has become stationary, when the first enthusiasm for automobiling as the greatest of all sports will have somewhat dwindled away.

If we had an electric carriage in every-day use it would be as feasible to arrange for charging it at a moderate monthly cost, say $10 or $5 a month. The illuminating company in a city or country town anywhere takes care of the electric car. You run it there in the evening and in the morning you go there and take it out, it having been charged during the night. A light charge is ample for all the use you will have for it during the day.

That would save the owner of the automobile a lot of trouble; it would mean it is the ideal carriage.

You may go further. You may arrange that a nominal additional charge be made by the illuminating company to send the automobile to your house and leave it in front of your door and come for it in the evening.

It would not be difficult if the electric automobile industry and the electric operating company co-operate, have an interchange by an annual or monthly payment whereby the automobile is entitled to be charged everywhere and anywhere. That would make it the simplest thing in the world. It would make it the ideal carriage, because there is no trouble connected with it.

EFFECTS OF OVERLOADING SOLID RUBBER TIRES

Tire manufacturers, after years of observation and experiment, have adopted a schedule of carrying capacities, which with but slight variations, is now considered standard. However, the factor of safety in the schedule is nil. So many other factors enter into the matter, such as excessive strains due to bumps, depressions in the roadway, grades, overspeeding, and the severe use of brakes, that no provision has been made for overload.

Just what is meant by the overloading of rubber tires? In the process of manufacture crude gum is mixed with pigments and the whole mass is kneaded together until the compound becomes homogeneous. After various intermediate steps, the rubber is placed in a mold and vulcanized. During vulcanization the tire assumes a more or less permanent form, to which it will normally return if it is not stretched or compressed beyond certain definite limits. If the stretching or compression exceeds these limits the strain will cause a rupture or disintegration of the rubber.

There are three kinds of overloading: The first is due to undersized original tire equipment.

The second kind of overloading is due to misproportioned equipment. Sometimes we find that tire equipment, regarded as a whole, is ample for the service required, will be lacking in carrying capacity at one end, while at the other end there may be an excess capacity over the actual demands.

The third kind of overloading, which is at once the most prevalent and the hardest to cope with, is due to the improper loading of the commodity. Sometimes this may be the result of faulty distribution of the load over the front and rear axles,

which may cause the failure of the tires wholly without the knowledge of the owner.

By far the most difficult phase for the tire maker to overcome is the deliberate placing on the vehicle too heavy loads for the tires to carry. In many cases there is the temptation to fill the truck to the limit of its physical capacity to move the goods. The merchandise must be moved, and "a load is a load," whether it exceeds the carrying capacity of the tires or not. Unless the tire equipment has an ample margin of safety, this attitude results in poor economy.

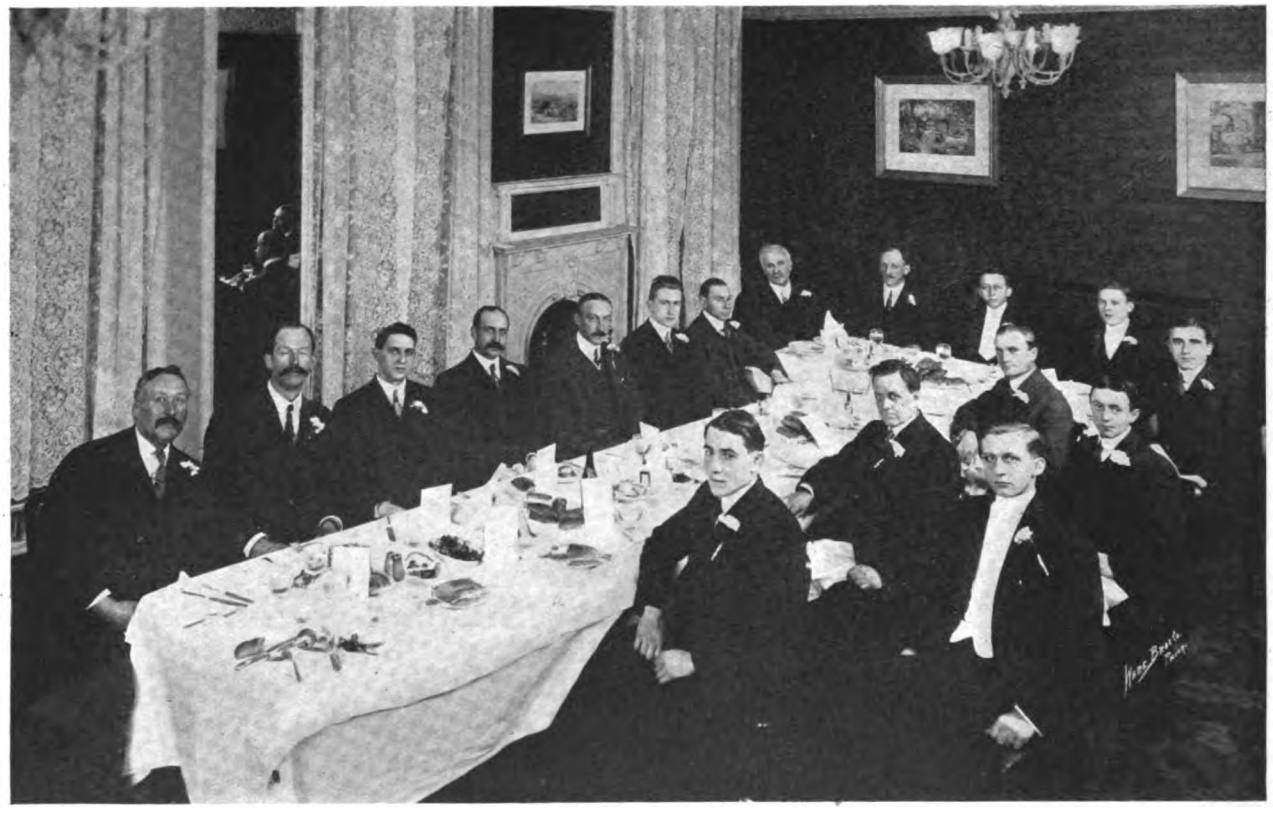
Turning now to the effects of overspeeding on solid tires, three things should be considered: First, it generates excessive heat in the tires, which tends to shorten the life of the rubber. Even though not overloaded, they may be driven so fast that they are "burnt up," as it were, in a very short time. Second, it accentuates shocks and jars due to unevenness in the roadway. The stresses thus set up are really the equivalent of sudden overloads, and they tend just as effectively to cause the premature failure of the tires as though they were loaded beyond their capacity. Third, overspeeding induces the severe use of brakes, especially in thoroughfares in which there is much traffic. This in turn is apt to cause unnecessary friction with the road surface, which, of course, wears out the tires promptly.

words of praise for the association and its alma mater were freely spoken.

"After the dinner, all lingered about in the dining room, discoursing on vehicular events of the year past, and reluctantly left for home."

MAY HAVE ONLY ONE SHOW IN EUROPE

A project is before the International Union of Automobile Manufacturers, which comprises the entire automobile trade of Europe, towards the holding of but one European show per annum, this show to be held successively in London, Paris, Berlin, and Brussels. Each of these cities would thus have a show every four years. The proposal was brought before the meeting at its recent session in Brussels, but was merely reported upon, no vote being taken. It is sought by this move to diminish the expenses of manufacturers who are at present obliged to bring out annual models and exhibit them at four or five shows each year. It is impossible, however, for any immediate change to be made, for Berlin, Paris, London and Brussels are pledged to a show at the end of 1914 and in each case have arrangements well in hand. The French manufacturers have long manifested a desire to hold their shows at less frequent intervals, but have never been able to convince English makers of the policy of the move. It is impossible to make any change in this direction until an international agreement has been arrived at.



TECHNICAL SCHOOL ALUMNI DINNER

In January the old "boys" of the Technical School for Carriage Draftsmen operated under the auspices of the C. B. N. A., enjoyed their annual dinner and talk fest at the St. Denis Hotel in New York City. Prof. Johnson, of the school, was the honored guest as customary. What follows is quoted from an account very courteously sent us by J. H. Klein, an alumnus of the true-blue kind:

"The affair was the most successful yet held and all left much imbued with enthusiasm. It was also well patronized considering the fact that members are distributed in far-off cities and some foreign countries.

"The repast was heartily enjoyed and during the evening

HERE'S TO HIM!

Traveling men are maintained at great cost by manufacturers, and, as a rule, are a likely lot of fellows. They possess a large fund of valuable knowledge for the dealer. They are experts on service. They know all the ins and out of the business. They are boosters for the association. The traveler makes you feel like the new bride of forty looks. Greet them, treat them kindly, be courteous. These things cost you nothing, but mean much to the traveler.

STANDARDIZATION OF FARM WAGONS*

Manufacturers of farm implements in recent years have very largely adopted steel construction. Wagons, however, of necessity are built very largely of wood, and standardization of farm wagons will tend toward economy in the use of wood stock. We are, therefore, all interested in the conservation of our forests.

As an advance step, the wagon manufacturers have done a great deal toward standardizing wheel heights, and we have a set of national construction rules governing the grading of wood stock. Wagon axles, poles, etc., are standardized as to raw sizes, whereas in times gone by each manufacturer had his own patterns, and the mills were forced to cut accordingly, and the waste was large as a result.

We have now come to a point where, in order further to standardize farm wagon construction, it is necessary to get the co-operation of the consumers.

Let me start with the statement that by reason of all wagon factories being compelled to cater to the individual ideas of wagon users in all sections of the country, an ordinary farm wagon is costing the manufacturer, and consequently the farmer, several dollars more per unit than would be the case if farm wagons could be classified and built more with the idea of fitting the conditions from a practical standpoint.

The farm wagon of today is strictly a freight vehicle and its purpose is to haul farm loads. Therefore, its use in practically all the country is precisely the same, and there is no more real need of the very large variety of construction and sizes than there is in any other article of universal use.

Why, then, should wagons be made and marketed, in any given locality, with the idea of furnishing the merchant anything and everything he thinks he wants—regardless of its adaptability from a practical standpoint, and regardless of the effect upon the roads of the various styles of tire equipments, etc.? In this one particular, I take it that you are all vitally interested in the tire equipment of wagons, based upon approximate loads, and of such widths as will insure the conserving of the roadbed, rather than the destruction of it through ignorance.

As an example, I have with me an order for a carload of 30 wagons, and it includes 14 different varieties. This is a condition that is nothing short of ridiculous.

In order to lay a foundation in a measure, that I am about to recommend, let me go over the sizes of standard two-horse farm wagons, as designated by skein measurements. They are as follows: 2⅜ x 7; 2½ x 8; 2¾ x 8½; 3 x 9; 3¼ x 10; 3½ x 11; 3¾ x 12; 4 x 12.

Bear in mind that practically each of these eight classes of wagons is built in all sorts of equipments—different heights of bolster stakes, wide track, narrow track, wide track narrow bed, slip pole, drop pole, 36-44 wheels, 40-44, 40-48 and 44-52 heights of wheels.

Now let us take the 3¼ x 10 wagon. This is the size of wagon that sells regularly in the central states from Ohio to the Wyoming and Colorado lines.

Kindly mark this statement: If a large wagon factory today should have on hand in the 3¼ x 10 size of wagon only, one each of all the styles and forms of equipment demanded in various parts of the country, and that they might be certain of being able to ship any particular equipment within an hour's notice, they would have to have on hand:

640 different styles of gears;

157 different sets of wheels with various heights and tire widths;

140 different styles of wagon boxes.

This is a condition that is appalling, and these figures will hardly be believed by the wagon manufacturer himself, unless he spends a week or more tabulating the various equipment he is compelled to furnish.

I have in mind four avenues of standardization, viz.: First, standardizing and simplifying the sizes of wagons; second, standardizing the track of wagons; third, standardizing and simplifying wheel heights; fourth, standardizing tire widths and thicknesses.

For instance, a 2½ x 8 and a 2¾ x 8½ two-horse wagon. In reality, it takes an expert to tell the difference in these two wagons. Difference in carrying capacity is barely nominal, as there is only from 35 to 50 pounds difference in the weight of these wagons. The box equipment, pole, axles, are the same. One wagon would take the place of these two were it not for the fact that—first, the salesman is educated to sell both sizes; the merchant thinks he needs both sizes, and buys them, and in turn asks the farmer which of the two sizes he wants.

Now we have eight sizes of two-horse wagons. Suppose we remove the incentive for the purchaser of a farm wagon asking the measurements of the skein of the wagon he is going to buy. Suppose we forget the size of the skein entirely. A farmer comes to town. He wants a light two-horse wagon, or he wants a medium two-horse wagon. Suppose we recommend that four sizes of two-horse wagons be bought, instead of eight, designating them as follows:

Light two-horse wagon—equals standard 2½ x 8.

Medium two-horse wagon—equals 3 x 9.

Standard two-horse wagon—equals 3¼ x 10.

Heavy two-horse wagon, such as is used for teaming work, logging, hauling wood, etc.—equals 3¾ x 12.

Results: The manufacturer of wagons would gain materially by such an arrangement. Jobbing trade and merchants generally would gain for the same reason that the manufacturer would be the gainer, and that is, their stocks would be simplified; they would need to carry less stock in order to supply their trade and a big incentive would be removed for the user of a wagon to buy other than the wagon that would be fitted for his needs.

There is no necessity or value in the variation in the track of wagons. It is simply brought about by one of two reasons.

I might say to start with, that there are no less than one-half dozen widths of track in the United States, although the common variation is the difference between the narrow track and the wide track, viz., narrow track 4 feet 6 inches center to center, and wide track 5 feet center to center.

The variation in the track of wagns has been brought about in years gone by through one or two reasons, principally.

First: A local wagon maker, in many sections, would have a track figured out of his own, and he would set the pace in his particular neighborhood. The other reason for maintaining a wide or narrow track in any one neighborhood has been simply the so-called necessity of each farmer buying his new wagon of a track that would fit the ruts made by his neighbors.

There can be no objection to standardizing the tracks to conform to the standard narrow—4 feet 6 inches center to center. The wide track wagons naturally carry longer axles—therefore, with a maximum load on a given size of wagon, the wagon will stand up longer and stand more hard usage by having a narrow track axle. It may seem ridiculous to tell you that there are towns in several of the states where an implement man is forced to carry both wide and narrow track wagons, selling wide track east of his town and narrow track west of his town. The necessity for following the custom as far as track is concerned in any given territory is becoming less and less as the country roads are becoming better. As roads are built up, rounded up, macadamized, drained, etc., the ruts forming even at the worst times of the year are becoming less noticeable.

As a practical example, seven or eight years ago in California, all tracks of gears were demanded, and each small valley or community had its distinctive track. Through the efforts of the National Association of Wagon Manufacturers

*Paper read before the American Society of Agricultural Engineers by E. E. Parsonage, secretary and manager John Deere Wagon Co.

and the implement men generally in that territory, the complicated situation was changed, and now in California no other wagon is sold than the regular wide track five-foot width.

Until comparatively a few years ago, there were more different wheel heights in wagon wheels than could be counted on the fingers of both hands; in fact, there were 41 different heights. Through the efforts of the National Wagon Manufacturers' Association several years ago, an attempt was made to simplify wheel heights, by naming four heights, viz.: 36-44; 40-44; 40-48 and 44-52.

This attempt at reducing the wheel heights to four standard sizes has been very nearly successful. There are some exceptions, however, owing to one or more manufacturers not having the heart to refuse building all heights of wheels because of the fear of losing a little trade. There is one manufacturer that even at the present time makes a 54-inch rear wheel.

For the past year, our wagon association has agitated a reduction in the height of wagon wheels. There is a consensus of opinion that there is no longer any necessity for building a 44-52 wheel height. The reasons for this assumption can be summed up as follows:

First: Wagon spokes are mostly sawed to equip 44-52 wheels. When 36-44 wheels are used, or any other height, from two to four inches of each spoke is wasted and thrown into the scrap pile. In the interests of conservation of wagon stock, elimination of the 44-52 wheel height is advisable.

Again: The higher the wheel the greater the strain on the axle and wheel also. It may be interesting to some of us to know that strain or breakage on a wagon wheel or axle is not brought about by the downward pressure of the load, but axles are broken and wagon wheels crushed in 99 cases out of 100 by reason of the side play or shifting of the load sideways. For instance, a medium two-horse wagon may be carrying a load of 3,000 pounds. If the road were good and level, the wagon could be loaded up to 5,000 pounds, or 6,000 pounds, without injuring it; but with a 3,000-pound load, one wheel drops sideways from the top of a stone; result, a smashed wheel or broken axle.

My proposal, then, is to make the 40-48 wheel height the standard high wheel construction. Wherever the 40-48 height of wheel has been standard, it has taken the place entirely of the 44-52 height. Objection has been made that the 40-48 pulls harder than the 44-52. In answer, there is only a 10 per cent. reduction in height of wheels, and tests show even under extreme conditions only a 2 per cent. difference in draft. Under ordinary road conditions the difference in draft is not readable on a dynamometer. The only other possible objection to the elimination of the old style high wheel is that in stump countries, as in Arkansas and eastern Texas, the stumps are so high as to interfere with the front axle when using only 40-inch front wheels. The difference in the heights of the front axle from the ground as between 40-inch and 44-inch front wheels is only two inches, the 40-inch construction having 18-inch and 19-inch clearance. This so-called medium height wheel wagon has taken well in the rough sections of the states mentioned and a little education will wipe out these fancied objections.

Furthermore, with the 40-48 wheel height the wagon box is lower, closer to the ground, and easier to load into. Then 40-44 is medium height, which is largely used in the east and south. Then 36-44 as low wheel construction.

This last proposition is, I believe, of more vital interest than the sections preceding this. I take this to be a fact because you all necessarily would be interested in good road building and road preservation. Therefore, a sane, simple standardization of wagon tire widths, based on various sizes of wagons and according to the maximum size of load carried by the average wagon, is of vast importance.

At the present time there are over 50 different width and thicknesses of tires demanded on the various heights of wheels and on various sizes of wagons. The result is that a wagon factory catering to the trade in various parts of the country is compelled to carry many hundreds of different sets of wheels in order to supply the demands. This wheel situation alone is little short of ridiculous. Farmers throughout the country have clung to the narrow tire because of the deep ruts in the road made by the other fellow's wagons having narrow tires, and when a farmer comes to buy a new wagon he dare not buy a three-inch tire wagon because four horses couldn't pull the wide tire wagon when the wheels got down into ruts with narrow bottoms made by narrow tire wagons.

I take it the sentiment of those interested in better roads lies entirely in recommending and forcing the use of wide tires. Therefore, I have the accompanying table to suggest as a standard tire equipment:

Suggestion for Standard Tire Equipment

Wood Axle, Cast or Steel Skein	Size	Solid Steel Axles, Size	Tubular or Hollow Axles, Size	Width of Tire These sizes to have tire
One Horse Light	2⅛ in.	1⅛ in.	.....	1½ in. wide
	2¼ in.	1¼ in.	1⅝ in.	2 in. wide
	2⅜ in.	.....	1⅜ in.	2 in. wide
Two-Horse Medium	2½ in.	1⅜ in.	1⅞ in.	2 in. wide
	2¾ in.	1½ in.	2 in.	2½ in. wide
Two-Horse Standard	3 in.	1⅝ in.	2⅛ in.	3 in. wide
Two-Horse Heavy	3¼ in.	1¾ in.	2⅜ in.	3 in. wide
	3½ in.	2 in.	2⅝ in.	4 in.
Two-Horse	3¾ in.	2¼ in.	2⅞ in.	4 in.
	4 in.	2⅜ in.	3⅛ in.	4 in.
	4¼ in.	2½ in.	.....	5 in.
	4½ in.	2⅝ in.	.....	5 in.

At the present time, something over 45 various thicknesses of tires are required. Some of the differences in the thicknesses are so small that it takes an expert to tell the difference between them.

Then again, on a 1½-inch tire alone, we are required to build wheels of various heights and in various thicknesses, as follows: 1½ x ⅜, 1½ x ½, 1½ x 9/16, 1½ x ⅝, 1½ x ¾.

Now, as to the various thicknesses of tire. On wide tire wagons ⅜-inch and ½-inch thicknesses should be the rule; that is, on light wagons carrying tires from 1½-inch to 2½-inch in width. On the 3, 4 and 5-inch tires, I would recommend ⅜-inch for soft roads or trucks used on the farm only; ½-inch thicknesses for ordinary road conditions and ⅝-inch or ¾-inch thicknesses for rough sections where rock is encountered in the roads, macadam, etc.

Recommendations as to Methods for Bringing About Standardization

The consensus of opinion seems to be that we should have uniform wide tire laws passed by the various state legislatures. If we can arrive at some decision as to what we want and what is needed, there remains simply the problem of best reaching those men who have it in their power to pass this uniform tire law.

We have all noticed that the various states are passing wide tire laws, and every law is at variance with every other law. I think what is needed is a plan worked out definitely whereby each size of wagon now in use shall be equipped with a tire sufficiently wide to carry a maximum load without injuring the roadbed. Such a table, coupled with a road law worded as would be approved by the road engineers connected with the various agricultural colleges and backed by your society, would meet the approval of every body of legislators in every state. It is no criticism of our law makers to state that they have in the past, in many cases, voted blindly for road laws because they have no guide and have not understood just what was needed the better to preserve the roadbed. If laws are made in the various states with definite similarity as to wording and forced equipment of tire widths, farmers will buy wide tire wagons accordingly, and soon change the road conditions for the better. I would like to say that the manufacturer has no selfish interest in forcing wide tires in place of narrow tires,

as he would just as soon build one as the other. However, we are all interested in simplifying the variety and we have, of course, a big interest in road betterment. In other words, we have no axe to grind in connection with the changing of tire widths, other than simplification.

The wagon manufacturers, implement men and jobbers are vitally interested in the other forms of standardization and simplification as described. The consumer would be assured of a better product in the wagon he buys, and he will, by co-operating with the manufacturer, obviate the necessity for very large increases in the cost of wagons within the next year or two. Farm wagons cannot be made long under the job shop plan now existing without the necessity of having to increase prices materially to the consumer.

I believe that there is only one sane basis upon which to start an agitation working toward the standardization described, viz.: To create such a sentiment in various ways as will bring the public generally to an appreciation of what is to be gained. The various agricultural colleges can do a great deal. The farm papers can be enlisted in our favor. I believe they will cheerfully publish any matter that is given to them along these lines.

Then, I think that a definite plan should be laid out and published through various channels, copies forwarded to the legislators of our various states, and copies sent to all road commissioners, enlisting their efforts. In turn, the National Wagon Makers' Association could get back of a plan and pass resolutions agreeing that after certain dates, certain changes in simplification and standardization be adopted at all wagon factories. In turn, the various wagon factories, through their traveling salesmen and jobbers, could carry on a definite campaign with the trade and farmers generally, working toward the same results.

WORLD'S PRODUCTION OF RUBBER

The following estimate of the world's production and consumption of rubber from 1905 to 1921 was compiled by a firm of rubber share brokers. Beginning with 1914, they are based on expected yields per acre, in tons:

Years	Plantation	Production Brazil	Other	Total	Consumption
1905.....	145	34,000	26,800	61,000	61,000
1906.....	510	36,000	29,500	66,000	66,000
1907.....	1,000	38,000	30,000	69,000	69,000
1908.....	1,800	39,000	24,200	65,000	65,000
1909.....	3,600	42,000	23,400	69,000	68,500
1910.....	8,200	40,500	21,300	70,000	66,000
1911.....	14,100	39,500	22,400	76,000	73,000
1912.....	28,500	40,500	30,000	99,000	98,000
1913.....	42,000	41,000	32,000	115,000	112,000
1914.....	64,000	40,000	20,000	124,000	126,000
1915.....	94,000	38,000	10,000	142,000	142,000
1916.....	121,000	35,000	5,000	161,000	159,000
1917.....	147,000	32,000	2,500	181,500	179,000
1918.....	166,000	30,000	Nil.	196,000	197,000
1919.....	183,000	30,000	Nil.	213,000	216,700
1920.....	198,000	30,000	Nil.	228,000	238,370
1921.....	209,000	30,000	Nil.	239,000	262,200

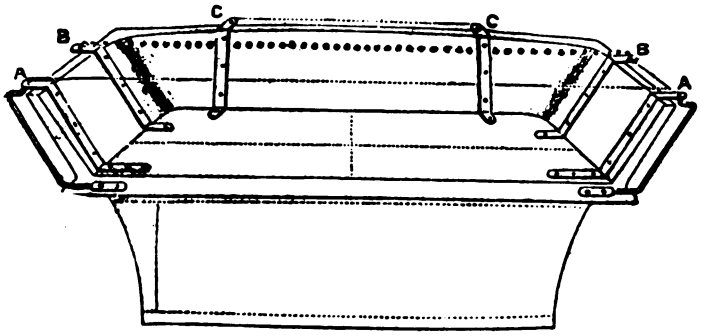
One of the most striking results of the slump in rubber prices has been the effect upon the market for inferior grades of wild rubber (Kongos, etc.), which have already become unsalable except at a severe loss. All competent observers agree that these grades are likely to drop out with startling suddenness, but to be on the safe side we have allowed for diminution of only 12,000 tons during 1914, and have assumed that for a year or two afterwards substantial, though diminishing, quantities of inferior wild rubber will somehow be brought to market. Another direction in which we have deliberately overestimated supplies is in the figures for Brazil. It must not be forgotten that of the 40,000 tons at present coming from Brazil considerably less than one-half is fine hard Para. The remainder consists of inferior grades which are likely to go the way of Kongos, etc., but in our estimate we have allowed for only a gradual shrinkage, and have left Brazil appearing as a producer of 30,000 tons per annum even after 1917.

Turning to the great question of future consumption, it will be seen from our table of actual results that for the past nine years there has been an average annual increase of about 10 per cent. The figures for 1911, 1912, and 1913 show an average increase of 19½ per cent. per annum. We have assumed an annual progressive increase of 12½ per cent. for the four years 1914-1917, but have then dropped the rate of increase to 10 per cent. This is probably a substantial understimate when the allowance is made for the stimulating effect of low prices on demand and for the rapid expansion of the motor industry.

Summing up the situation, it is pretty clear, from the statistics, that no real overproduction exists at the present time, nor is there any reason to expect it in the near future.

DIRECTIONS FOR ORDERING TOPS, CUSHIONS AND BACKS

For tops, send measure from A to A, B to B, C to C, and A. to B. All measurements from center to center of seaf iron



holes. When seat is not ironed, give distance across top of seat, outside to outside.

For backs, same measure as tops.

For cushions, measure length and width of seat on bottom inside.

ALL THE KINDS OF MULE

The greater part of the mule supply comes from the farms of the west and southwest. A farmer will raise from two to eight mules a year for the market. Until two years ago Missouri was the greatest mule producing state. but now Texas produces more mules than any other state. Missouri is second and Kansas third, and many come from Oklahoma and Nebraska.

Nearly one-half the mules are "cotton" mules, that go to the cotton fields. A "cotton" mule must be a good mule, bringing from $125 to $200, but he doesn't have to be large. The height varies from fourteen to fifteen and one-half hands, and the weight from 750 to 1,100 pounds. Texas is getting to be more and more a good mule market, owing to the cutting up of the big ranches there into small farms.

Among the highest class of mules is the "sugar" mule, which goes to the sugar plantations of Mississippi and Louisiana. He is a big, fancy priced animal, strong enough to do the hard work in the heavy, black bottom lands, and brings from $220 to $300.

Then there is the "rice" mule, used on the rice plantations. He need not be so large but must be rugged, for he has to work hard in wet ground. The "logger" mule, used in the lumber camps, is not a fancy animal either, but must be rugged and strong, for he has to haul heavy loads.

The "construction" mule, used by contractors in railroad work, must be big and rugged. Style is no object, but the buyer selects mules with big, broad hoofs to make easier the drawing of heavy loads in loose dirt.

The "levee" mule, for work on the building of levees along

southern rivers, must be big, for he is often hitched singly to a two-wheeled cart.

"Pitters," used in mines, are a distinct type; they must be broad and chunky, but not tall. The mule bought for any particular mine must not be too tall to go through the galleries of the mine. Some mines will not buy a mule that is more than 50 inches high. There is a mine near Des Moines and another in Ohio that will not take a mule more than 48 inches tall. The ideal "pitter" is shaped like a daschund, with a long body and short legs. Miners will not buy a white mule, because in the gloom of the mine tunnels he scares the other mules.

Then there are "mahogany" mules that go to the mahogany lumber camps of Central and South America, the "army" mule, bought by the government, and, highest price of all, the "advertiser" mule. "Advertisers" are used for show purposes and for driving spans. They must be big, well shaped, well matched and of such good appearance that they attract attention, make people talk and advertise the owner. A pair of these sold for $1,000.

There will never come a time when the demand for mules will grow less, and there is every reason to believe it will go on increasing, and the price will not go down, either. The south and west are becoming more and more agricultural sections and the mule is the ideal work animal of the farm.

THE FUNNY MAN AND HIS CORN PLANTER

The corn planter is a combination of Roman chariot, threshing machine and Victor Victrola. The machine does its deadliest work during the latter part of May and early in June, of each year.

The machine has an artistic temperament. A big field of corn architected with a planter is pleasing to the eye of a Cubist, after the corn has begun to grow. Viewed from any angle the corn rows are as straight as a yard measure and as regular as a Sunday School superintendent.

A good, well-made corn planter is supplied with several varieties of phonograph records to regulate the number of kernels of corn in the hill. The operator can, by changing the records, produce a duet, trio or quartette of corn stalks in the hill. Some manufacturers have arranged so that different things can be done on the same record without changing the disc.

Corn planters are said to have first been made in the time of Abraham. A planter, in the hands of some careless farmers will, after the rain and snow have done their best, look like one of the original machines uncovered in the ruins of ancient Babylon. It is the habit of railway officials to order all engineers to blow their whistles constantly while passing through the corn belt in planting time, so that passengers will not be annoyed by the noise.

THE AGRICULTURAL YEAR

The estimates of production of the different crops and the prices of same on farms are based on reports from five independent sources of information, namely: township correspondents, county correspondents, state statistical agents, special field agents, and aids reporting to the state and special field agents, individual farmers, and special correspondents. Estimates from these sources are received monthly at the Washington office, where they are tabulated and the totals by crops and by states are passed upon by a crop reporting board.

The estimated total production and value of farm crops and live stock, when assembled for the whole United States, is so large that if allowed to stand alone without explanation it is apt to be misleading. To be of value, the totals showing such enormous production of wealth must be considered in connection with the amount of capital invested, the cost of production, and the number of adults employed and living on farms. In round numbers, it is estimated that the total farm value of all crops for 1913 is $6,100,000,000. The total farm value of animals sold and slaughtered and of animal products is $3,650,000,000, making an estimated total of the gross value of farm products in 1913 amounting to $9,750,000,000.

It is roughly estimated that of the 1913 crop, valued at $6,100,000,000, approximately 52 per cent. will never be sold, but will remain on the farms where it was produced, leaving only 48 per cent. which will be sold for cash. This will reduce the estimated cash sales of farm crops to $2,929,000,000.

Of the total animal products, valued at $3,650,000,000, it is estimated that 20 per cent. will be consumed on the farm and that approximately 80 per cent. will represent cash sales, which will amount to $2,919,000,000.

It would appear, therefore, that the total net cash sales of both crops and animal products for the current season will be approximately $5,847,000,000, which will represent the total cash income of all farms in the United States.

The total number of farms as reported by the Bureau of the Census for 1910 was 6,362,000, which was an increase of 11 per cent. over 1900. Assuming the same rate of increase since 1910, the present number of farms will be approximately 6,600,000. The average cash income per farm would, on this basis, be nearly $900. This does not represent net income, for out of this amount the farmer must pay for fertilizers, hire of help, stock feed, maintenance of farm equipment (including farm tools and machinery), and taxes.

ST. LOUIS I., V. & H. ASSOCIATION ELECTS OFFICERS

Following are the new officers and standing committees of the Implement, Vehicle and Hardware Association of St. Louis:

H. P. Hubbell, president; J. F. Murphy, first vice-president; J. D. Cathey, second vice-president; C. F. Batchelder, third vice-president; Geo. B. Ogan, secretary and treasurer, 804 Pierce Building.

Executive Committee—P. E. Ebrenz, chairman; C. A. Dennison, Carl Birdler, Geo. B. Ogan, G. W. Tibbetts, W. H. Roninger, H. P. Hubbell.

Legislative Committee—E. L. Galt, H. Mollman, J. D. Manley.

Fairs and Expositions—Geo. Schelp, J. A. Schlecht, E. H. Dewes.

Freight and Transportation—E. C. Meyer, L. A. Geserich, V. J. Heitmeier.

Press—Frank Goodwin, F. E. Eichler, C. N. Waterhouse.

Technical Education—W. A. F. Uhlenhaut, Ernest Lucas, Oscar Cook.

Membership—Norman Champ, E. C. Sullivan, J. D. Lindsey, E. L. Roninger, W. E. Clark, Henry Speck.

Kindred Organizations—Thompson Price, R. E. Gardner, Jr., C. D. C. Junge.

Foreign Trade—W. S. Sanders, G. C. Weyland, W. Avis.

SCHAEFER WITH FLINT VARNISH WORKS

A. E. Schaefer, formerly president of the Abbott Motor Co., Detroit, Mich., has become manager of the railway department of the Flint Varnish Works, Flint, Mich. Before entering the automobile industry Schaefer was with the Sherwin-Williams Co., of which he was sales manager when he left to form the Ohio Motor Car Co.

$10,000 VERDICT FOR LOSS OF LEG

A jury gave Charles Perry judgment for $8,000 against the Milburn Wagon Co., Toledo, O., on February 4. Perry was injured September 22, 1910, which made necessary the amputation of a leg below the knee. A common pleas jury gave him a verdict for $10,000 January 29, 1913. This was reversed by the court of appeals and the case was remanded for trial.

Paint Shop

ART OF STENCILING

W. Stewart-Greene, an English authority, had much to say on stencils that will be of interest to wagon painters in a recent address he delivered on the subject:

It is somewhat difficult for one to realize the extent to which stenciling as a means of decoration was used in past ages. Whether the ancient Egyptians and Greeks used this method of stenciling for the numerous repetitions of their conventional designs of the lotus, palm, acanthus or honey suckle ornament, etc., I am unable to state, but there is no doubt that stenciling was used in the early days; skilled craftsmen from Italy and other countries traveled from place to place, decorating the churches, etc., and I have no doubt that the stencil plate was used in conjunction with hand work.

Stenciling has also been largely used in Indian and Chinese temples, and also by Persian decorators. There is little doubt that it was largely used in the middle ages. It was very prominent in ecclesiastical work: charming examples of stenciling are to be seen on the ceilings of palaces and churches in various parts of Italy, France and England. Where much direct brush work has been resorted to, it is difficult to decide how far stenciling was used. Certainly the surest indication of its use is absolute accuracy in repetition, for the hand can never approach that which stenciling invariably accomplishes in this direction, also the texture of brush work being entirely different from that of stenciling, the latter possessing a distinct quality of its own, which is quite unattainable with the free brush.

The art of stenciling occupies a distinct place among the arts and crafts. It is a complete craft in itself.

Many look upon stenciling as a mere mechanical process, but I venture to say that it is an art capable of a high and useful development, a field for procuring individual taste and skill to practically a limitless extent, as the Japanese artists have shown us. The introduction of the stencil into Japan is attributed to a dyer, named Someya Juzen, who lived in the latter part of the 17th century. The Japanese have been, and still are, thoroughly successful in the use of the stencil plate, and we can get much inspiration and valuable instruction from them; their stencil plates are marvelous, and they use them for decorating textile fabrics and dresses, as well as for wall papers, screens, etc.

The waterproofed paper they use for making the plates is of exceedingly thin substance, is made of mulberry fibre, enabling as many as a dozen patterns to be cut at one operation.

The Japanese craftsman pushes the long thin knife invariably before him, just the reverse way of the English stencil cutter. The punctured holes or dots, which are such a fine feature in Japanese stencils, are produced by delicate punches; many of the sheets, when the pattern has been thus cut away, are so fragile that the paper left will not hold them together, so they are strengthened by covering one sheet with adhesive substance, and stretching across the plate a number of silk fibres—which form "ties" to hold the design together—so fine that they do not interfere with the brush work. Another stencil plate is placed exactly over the underlying stencil and threads, and both sheets pressed accurately together. The Japanese find that a very thin paper is better for their delicacy and wealth of detail.

The value in stenciling is mainly in the design, and the fitness of design to stenciled application, the care and perfection of cutting out, and the unlimited possibilities of the various methods of execution.

The stencil plate, if it is to serve as a shield through which the design is to be worked, must, of course, hold together. In the simplest and most elementary patterns, such "ties," as they are called, are needed. It is futile to try to avoid or disguise them. The "ties" are the key of the situation, and the art of the designer is in contriving that they take their proper place in the scheme, never unduly asserting themselves, and when felt, helping instead of hurting the effect. The "ties," if judicially distributed, form an additional element to the beauty of the design, and therein lies the art of the stenciler.

The best designs are those in which construction is confessed —where the ties form a feature in the design. The stencil is the most severe and exacting master of simplicity, showing the value of broad and flat tones combined with accurate drawing, and proving conclusively the vital importance of composition.

A good design is tied together by the very parts that render it beautiful in composition. Of course, there are two kinds of ties, good and bad. Those ties which require "filling in" are the wrong kind. Stenciled work should, as far as possible, remain untouched after the stencil plate has been removed from the work.

How to Cut Stencils

The paper for cutting the stencil plate is laid on a large slab of glass, so that the cut shall be perfectly clean on the under surface, the point of a sharp penknife being used for the cutting out process, keeping the point of the forefinger constantly pressed upon the back of the blade. The shorter the blade the better, as this prevents the steel bending when under pressure, which would otherwise interfere with the accuracy of the work. The stencil paper should not be fastened down, but let the left hand control the loose paper, turning it in various directions in sympathy with the movements of the knife. In cutting straight lines, one is apt to use a mechanical guide for the stencil knife. Much better results are to be achieved from the use of the knife by freehand manipulation; and whenever possible cut towards yourself and in such a way as to keep the line of the knife's progress well in view.

There are two general methods of stenciling; first those stencil plates in which the cut out patterns represent the ornamental design in the color applied; and second, where the stencil is cut from a background, so that the forms of the design are expressed by the color of the ground stenciled upon.

The latter is what is known as a background stencil; generally one color being used, but these patterns are usually incomplete, until a line of contrasting color has been applied a little distance away from the stencil work, leaving a boundary line of the surface color, which becomes one of the decorating colors.

Then again, patterns can be designed which combine both methods, thus making the final effect appear to have much more labor involved than would actually be so. The results obtained by this method are very effective. One must be careful to cut pieces of the actual ornament in the background plate, which renders accuracy in fitting. If several plates are being used, of course the greatest care must be taken to make them coincide.

The paint, stain or dye should be applied by a gentle movement of the brush known as " stippling" or "dabbing." To rub the paint one is almost sure to result in the paint being carried to the underside of the stencil plate, causing smeared or "woolly" edges; always work from the edges of the forms towards the center of the openings.

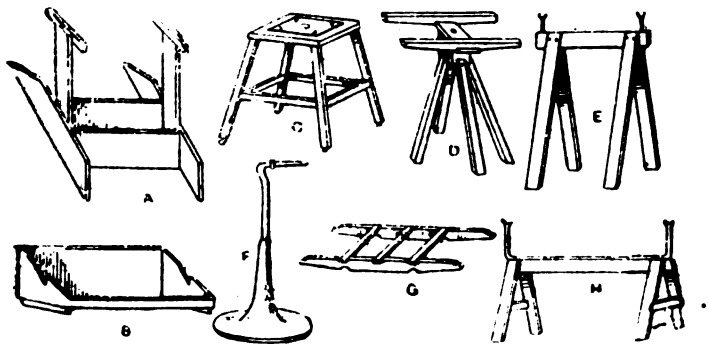
In multi-colored work, an improved richness is given by

gradually merging one color into another. This is known as blending, and to do this successfully, the darker colors should always be applied first, following with the medium colors and finishing with the lightest colors, all by stippling. And just as the ties give character and form to the stencil, so also the dabbing on of the pigment gives to stenciled work a quality all its own. Simple stenciling in one or more colors by means of a single stencil plate forms the basis of all other stenciled work.

TRESTLES OR STANDS

The accompanying illustrations show a variety of stands, and trestles, and a revolving wheel jack, as found in most paint shops. These illustrations are self-explanatory. Some of the items belong essentially to the horse carriage and are not much used in connection with motor body painting. The spindle or wheel-jack is, however, still used, and the one shown in the illustration, with a heavy cast-iron base, is to be recommended because of its solidity and steadiness. The spindle end, turned over at the top, should have its point a little above the horizontal line, so that there may be no tendency for the wheel to fall off.

Another form of wheel horse can be constructed as follows: A tripod is made, and to this is fixed about 2 ft. of 1½ in. or 2 in. gas pipe, making in all a height of about 3 ft. 6 in. An old axle end is then bent over at right angles and dropped



An Assortment of Paint Shop Appliances. (A) Frame for Bodies; (B) Seat Frame; (C) Body Trestle; (D) Body and Under-Carriage Trestle; (E) Shaft Horse; (F) Wheel Jack; (G) Under-Carriage Frame; (H) Under-Carriage Horse.

into the top of the pipe. This is a simple appliance and yet extremely useful, and it enables the work to be moved about without the necessity for turning the whole tripod, as the axle end is comparatively a loose fit in the pipe.

For finishing wings it is very convenient to have a special frame made, with a horizontal spindle, to the outer ends of which suitable arms are fixed, and to these arms the wings are bolted. In this way it is possible to turn the wings through a whole circle, and thus the undersides may be treated without having to detach them from the frame after the upper part has been finished.

For the initial stages of body painting it is useful to have special trestles, or stools, of a convenient size for carrying a body, and these should have good large caster wheels attached to the legs so that the workmen can wheel or turn a body about without any exertion, or without having to call the assistance of another hand. The cost of appliances such as these is quite inconsiderable, and they very quickly recoup their cost in saving of time.—Cooper's Carriage Journal.

COLD WATER AND VARNISH

When the water bath is given the varnish at a rather early stage of the drying process, or while the varnish is perhaps only the length of a day's drying ahead of the dust free condition, the results are not dependable. When varnish that is sufficiently dry to be entirely free from the action of dust or dirt upon it, and is dry only to that extent, is given a cold water bath, contraction immediately ensues during which action of the physical structure takes place and the escape of the liquid gas of the varnish through evaporation occurs. Cold water baths for varnish are both proper and beneficial when the varnish has reached a state of drying from which there is no contraction, but when the latter ensues flatting and loss of lustre are very common results.

When a high grade finishing varnish is permitted a natural time for drying, it retains those elements which confer upon it additional brilliancy and elasticity. When forced to dry through contraction by the premature application of cold water it plainly follows that the varnish must suffer injury to either its lustre or to its naturally elastic quality or to some other equally important constituent part.

When first class painting and varnishing is being done there occurs a necessary assimilation of the varnish coats and for the development of such a result a considerable time is needed for these coats to reach a condition which will safely permit the washing invariably, and often mistakenly, advised.

In planning to maintain the varnish surface in the flower of its brilliancy to the longest age possible, it is suggested by M. C. Hillick that the foundation over which the varnish is placed should first be built up in orderly fashion.

You all know how inferior fillers, and no less inferior shellac, rapid drying rubbing varnish, poor surfacers and equally poor colors, not to mention lack of both judgment and skill on the part of the workman, not infrequently bring about a certain swift destruction of all the finer and essential things united in a finishing varnish of premier quality.

To maintain a good finish we must have a supporting foundation made up of well balanced and harmonizing materials, each coat of which is chemically related to every other coat in a way and to an extent that blends them all into one uniform, indivisible coat.

This result cannot be obtained without some forethought and study, and the putting aside of possibly acquired prejudice.

Logically, it is to be understood that in this matter of maintaining varnish in its finest estate, very much depends upon the varnish itself. No results worth while need be expected from the use of an incapable varnish—a varnish composed of cheap gums and oils, and coarse ingredients, inadequately ripened, insufficiently filtered and stricken through with the deadly blight of unscientific manufacturing processes.

A varnish, to maintain itself in proper form on the 50 horsepower automobile or the delicately poised road wagon, must possess some opposite characteristics, such as toughness and hardness, quick drying and elasticity, and a lustre that will show your face as in a mirror. How can a hard varnish be tough or elastic? Or how can an elastic varnish dry quick enough to suit the man who counts minutes as dollars? How, indeed, can these things be?

And yet, in large part, they constitute an established achievement. Your reliable varnish makers are today furnishing varnishes endowed with these apparently contradictory virtues.

PAINT POINTS

Charles Harrison, in The Decorator, writes of several subjects of interest to painters, from which we extract a few items:

Genuine turpentine is the spirit obtained by distilling the oleoresin collected from the Florida pine. The spirit is a water white mobile liquid with a mild aromatic odor. White paper stained by saturation with it and afterwards hung up, should become opaque when exposed for about 30 minutes at 60 deg. Fahr. A good sample should not have a wood smoky odor, neither should it have an odor resembling freshly produced pine sawdust. At the present time material with an odor to that just described is being sold as the genuine article, while

such is not the case. Decorators should only accept deliveries of turps when invoices are marked genuine American turpentine.

Genuine raw linseed oil, freed from dregs by tanking, is the only reliable paint vehicle for outside work. Boiled oil, though furnishing a more lustrous film on newly finished work, is comparatively second fiddle to raw oil. Genuine linseed oil, when exposed in a layer forms a tough, elastic, infusible, nearly insoluble film. No substitute has yet been found which exactly squares to the above quoted specification. It may be held that modern oil substitutes are scientific productions. That may be; but scientists are not painters after all said and done.

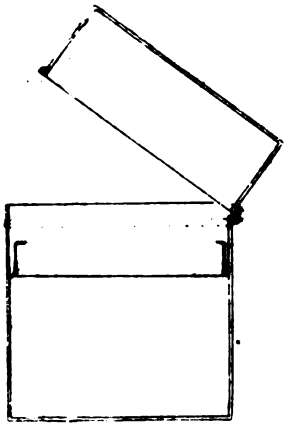
Bleached powdered barytes is a heavy and in the dry state permanent white crystalline substance-pigment. When ground or mixed into oil the white fades owing to the isolation of particles, due to capillary attraction of oil; each separate crystal as a consequence becomes somewhat transparent, thus allowing the bulk of the light rays to be transmitted instead of reflected. Hence it follows that barytes is a good diluent or what is better a stable diluent. Stable because of the inert nature of the mineral, inert in the sense that the substance is almost entirely insoluble in water, and all known common liquids, with exception of concentrated sulphuric acid in which barytes is dissolved on heating. As a diluent because the material may be added; of course judiciously, to colored pigments ground in oil, without either decomposing or masking them.

Shellac is not a gum resin, neither is it a resin. Shellac is better described as a resinous substance.

PAINT SHOP APPLIANCES

All brushes and tools should be washed out with turpentine after being used in coarse color for some time, and may then be put into best color, and ultimately used for varnish and japan.

The largest, used for bodies, are what are known as 4.0 stock brushes, the smaller ones (which are called "tools"), for lights and other small places, are the ordinary No. 8 or No. 10 size,



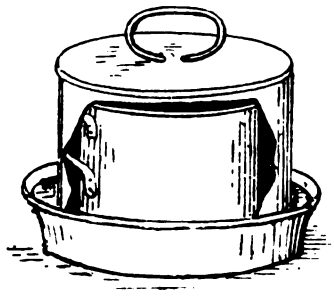
"Keeper" for Varnish Brushes

while for carriage parts and wheels those marked No. 12 are most convenient. The same kind of brushes would be used for filling up. Flat brushes are now much in favor.

All coarse color brushes, while not in use, should be kept suspended in a tub of water, which can be done by simply passing a piece of stout wire through a hole in the handle and allowing the wire to rest on the edges of the tub, care being taken that the brush is not immersed too deeply, as this would cause the handle to swell and twist the binding.

"Best color" brushes are those which have been well worked in the coarse colors and filling up, but some workmen, for best colors, prefer brushes made of French bristles, as these are softer and are ground down at the ends to a kind of chisel point. They are oval in shape and do not require binding, the bristles being of the required length.

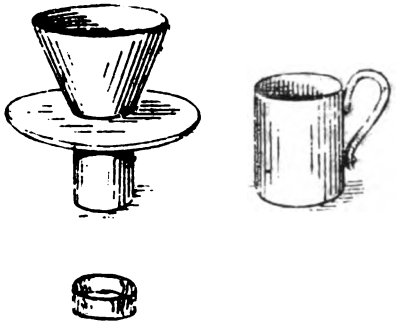
For picking out and striping, we use what are known as "pencils," which are made either of Russian black or red sable hair, or of camel hair, the former being the most expensive and much perferable for heavy colors such as white or vermilion. They are made in various sizes and shapes. The picking-out pencil varies in size from one which will produce a line of one inch in width to that which will produce one quarter of an inch wide. Anything finer than this latter is called a "fine liner," and some of these latter are so small and fine



Utensil for Keeping Mixed Color or Putty

as to be able to produce a line very little thicker than a human hair. The hair for these pencils is generally about two inches long, and is bound with silk twist, put into a quill according to size, the quills, after being cut to the required length, being soaked in hot water to make them soft and pliable. The hair, bound at one end, is pulled through the quill until there is just sufficient left to give a firm hold, which is effected by the contraction of the quill as it becomes dry. Camel hair answers moderately well but lacks the strength and elasticity of the sable, and is only used in the shape of sword or dagger pencils.

Sometimes painters are inclined to be a little careless, and throw their brushes into the pail, but this very soon puts them out of condition as they get misshapen from resting upon the point, and generally quite lose their proper "hang" and elas-



A Varnish Straining Outfit

ticity. Change the water every other day at least, and see that it is pure and clean. Instead of wires spring clips may be used, driven into the sides of the tub.

Protection of Prepared Color

Although nowadays, when we are using ready-ground colors, there is not much excuse for preparing more than is needed from day to day, it may sometimes occur that there is left a quantity which, if it is quick-drying, is apt to crust over. To prevent this happening, a useful plan is to stand the tin box of color in a shallow tray of water and have a loose wide cover to drop it over (see Fig. 2). This provides a moist, air-tight, dust-proof compartment, and prevents deterioration. This appliance is also useful for keeping putty in good condition. If a little water be poured over the mass of putty and

then the whole covered, as shown in the illustration, it will keep in perfect condition for months.

Another useful utensil in the paint shop is a strainer shown by Fig. 3.

THE SMALL PAINTER

Probably there is no man in the trade who executes his work under so many diffculties as does the vehicle painter in small towns.

He seldom has a shop that in any way meets his requirements; he hardly ever has suitable tools; he often has to use materials that are not adapted to his work, and yet, regardless of all these handicaps, many of them turn out work that compares favorably with that executed under favorable conditions.

It is axiomatic among vehicle painters that if it is proposed to do a good job on a pleasure carriage, several things are necessary. The surface must be faultless; plenty of material of the proper kind must be applied; the work must be done in properly ventilated rooms; the materials must be in harmony, the proper amount of time must be given between coats, and above all, scrupulous cleanliness must prevail all along the line.

Of course we know how desirable all these things are, and we believe that if the painters in the smaller towns had all these conveniences they could execute better work and do it more comfortably.

The village vehicle painter is not, in most cases, a strictly one-trade man. On the contrary, he usually has to paint signs, do graining, hang paper, paint houses, or even stain and varnish coffins. For this reason it is hard for him to keep his hand in at any branch of the business, and we all know how desirable it is to be expert when it comes to painting a carriage, a wagon, or an automobile.

TESTING FOR GOOD PUTTY

Putty, when pure, is a simple mixture of whiting and raw linseed oil. Whiting, being plentiful and cheap, is seldom substituted, unless it be with barytes. At the same time there are degrees of fineness and freedom from gritty contamination, even in whiting, which affect the finished product. It is generally to the oil constituent that we must look for cheapening adulteration, and the most commonly used are the mineral oils and fish oils. These can be determined by practical tests. First make up a small quantity of putty from the whiting and raw linseed oil which you have in stock and know to be fairly good. The proportion of these by weight should be about 5½ of whiting to 1 of oil. Work this well in the hands and note the smell, color, etc. Now take a similar quantity of the putty to be tested and compare. You can soon detect the odor of petroleum or fish oil if they are present, especially if your hands are warm. For the next test, roll a little of each into a ball, place on the end of a pointed stick, and apply a match to the putty. If made from pure linseed oil it will not "flame"—if mineral oil is present it will burn like a candle.

TO KEEP PENCILS

If the pencil is not thoroughly cleaned after using, the paint will dry and clog up in the butt spoiling its use. Pencils may be rinsed with kerosene. Kerosene is cheaper than turps, will not evaporate so quickly and the color settles to the bottom in it so that if a gauge cup be hung in it and left on the shelf there will always be clean kerosene to wash the pencil in. Thoroughly wipe after rinsing and work right into the butt of pencil a little lard in which there is mixed a small proportion of castor oil. Use the thumb and forefinger for working the fat into the pencil and bring it off to a sharp wedge-shaped point and stand it in a case where the point cannot be touched. When wanted again, a little rinse in the kerosene and wipe with a rag and it is in working order.

COLOR PERMANENCY

A feeling for warm colors and cool colors comes from our contact with nature. Warm colors we associate with blaze, heat and sunlight; cool colors with leafy shadows, blue sky, ice and distant hills. We imagine nature cruder than she is. So if we attempt to outwit her by using paint that is greener than gress she responds by fading it until it is fit to live with. All bright colors in inexpensive materials are likely to fade for fast dyes are expensive. Greens and blues are especially treacherous, because, roughly speaking, colors tend to fade toward the yellow. Hence buffs, tans and browns are usually more permanent.

BAD SCROLLS

Most scroll patterns are frivolous and meaningless and are likely to be bad. Large medallion or shield-shaped spots with scrolly outline are a very common and distressing pattern. The figures of a pattern should not be too far apart, else we are continually surprised at each repetition and never get used to the idea. Avoid selecting patterns that, viewed from a distance, suggest queer faces or other absurdities. If a pattern suggests an odd resemblance once it is likely to do so again.

VALUE OF GLAZE

Glazing is a process of covering an opaque ground color with a coat of transparent paint, the ground color and the glaze often being of different colors. By this means a richness and depth, an interesting quality, is secured, which is not obtainable by the usual process of painting in opaque color alone.

PLEASING TO VARNISH MAKERS

There is a promise of a large turpentine industry in the west and southwest, the raw product being supplied by the resinous gum of western yellow pine.

FIFTY PER CENT. FOR SCHACHT CREDITORS

According to a report of Receiver Dietz, creditors of the Schacht Motor Car Co., of Cincinnati, O., will receive a dividend of 50 per cent. It shows that receipts between April 19, 1913, and January 26, of this year, amounted to $234,781.62, and his disbursements to $204,759.52. In addition to the cash balance, $30,022.10, there are notes and accounts receivable amounting to $41,521.37. The total claims aggregate $139,439.79.

ENGLISH CARRIAGE CO. AT MOBILE TO RETIRE

The English Carriage Co., Mobile, Ala., a company with liabilities of $34,474, a stock valued at $25,000, and bills outstanding to the extent of $24,330, announced January 27 voluntary retirement from business. The stock was transferred to three trustees, who will continue the business in the interest of creditors.

MAY MAKE WIRE WHEELS IN McKEESPORT

The United States Wire Wheel Co. has been organized in McKeesport, Pa., with George Baehr as president, for the purpose of manufacturing the wire wheel invented by Mr. Baehr. J. R. Worley, of McKeesport, is the only other man identified with the project whose name has been made public.

FREMONT CARRIAGE CO. BANKRUPT

An involuntary petition in bankruptcy has been filed against the Fremont (Neb.) Carriage Co. by Mossman Yarnelle & Co., Gert. Lynnbard & Co., and the Buffington Wheel Co.

Smith Shop

MAIL AXLES

Mail axles are different from any other axle inasmuch as the wheel is held in position by means of three long bolts, which pass through the hub of the wheel and an iron washer situated behind the collar of the axle. The center part of the axle is usually round, but about a foot on either side, behind the collars, is squared for convenience of fixing the springs; or solid flaps are provided. In front of the collar (on the wearing surface) the axle is without taper, but close to the collar there is a part about half-inch wide, which is thicker than the remainder. This is the usual breaking point of this class of axle, and the thickening here is to strengthen it accordingly. It will be noticed that the oil chamber in the bush is situated at about this part, so that the bush lends the axle no support there. It would no doubt be better if this thickening was extended a trifle, and tapered down to the lighter part, the conical shape extending for the length covered by the oil chamber. On top of the wearing surface will be noticed a narrow groove, which helps to keep the axle properly lubricated. The bush covers the collar and is made long enough to be threaded inside the front to take the brass cap. Leather washers are introduced between the collar and iron back washer and in front of the collar.

This type of axle requires a certain amount of care, and the caps should periodically be removed and the axle oiled, while at the same time the nuts on the hub bolts may be screwed up if required. As soon as the leather washers appear to be getting worn the wheels should be taken off, and the bushes and axle ends cleaned with cotton waste, or a piece of old sacking or cloth, taking particular care to see that the oil groove is made perfectly clean and free of all dirt. The presence of dirt is often the cause of an axle firing. The new washers may then be fitted, clean oil or grease introduced into the oil chamber of the bush (a little may be smeared on the axle end) and the wheel refixed. The cap should have any old grease cleaned out, be about half filled with clean grease, and screwed on tight. If too much lubricant is placed in the cap, some will very soon be forced out of the back of the bush, whence it will get on the back of the axle, springs, and wheels, collecting dust and looking very unsightly. Washering and oiling is not difficult or laborious, but must be done intelligently and with care, the washers being properly fitted to retain the oil.

The advantages of the mail axle are its safety, inasmuch as, if the axle breaks inside the bush the wheel does not come off. It runs a long time without oiling, it is very simple and does not require replacement of cotters, pins, and nuts; the leather washers tend to reduce vibration, and it is extremely unlikely to draw the bush. Against this must be set, the renewal of leather washers, and the necessity of seeing that the nuts on the hub bolts are kept fairly tight (when loose they are apt to get knocked off by the play of the wheel). These are comparatively small matters. A more serious one is the necessity of a fairly large diameter hub to take the three bolts. It is probably the best all round axle for fast traveling vehicles.

TIME DEPENDS ON BULK

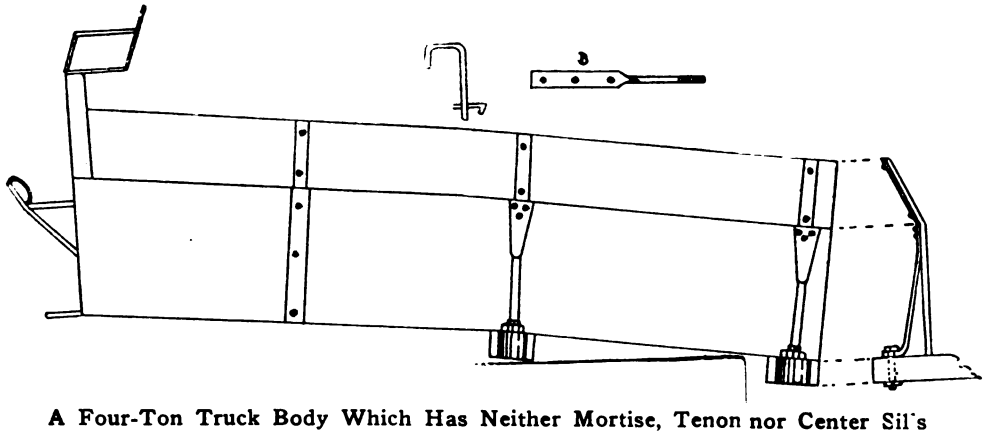
The length of time pieces should be left in the furnace in case-hardening processes depends largely on the size of the pieces and the size of the boxes. Where small pieces are to be carbonized small boxes should be used on account of the excessive time it takes to heat large boxes through. The time of carbonizing should be taken from the time the furnace reaches the carbonizing heat, and not at the time the boxes are placed in the furnace, as it is seldom furnaces are heated in the same amount of time every time they are started. Of course, this applies only to furnaces that are not run regularly. Where furnaces are run continually, the method of taking the time from the time the furnace is charged, can be used.

SIMPLE DESIGN FOR FOUR-TON TRUCK

This wagon body has neither mortise, tenon nor center sills, and is described by W. H. Gunn in American Blacksmith. The illustration helps to make the account interesting. It is bolted together with four crossbars cut out for the sills ¼ inch deep and 2½ x 5½ inches equally placed between the other bars. Four or six straight side braces with ⅝ carriage bolts and 5/16 rivets.

Dimensions—Running gear: Gear, 42 in. wide from center of side springs; Sells' patent axles, 52 in. between collars; front axle, 2½ x 10 in. box (steel); back axle, 2⅝ x 10 in. box (steel); wheels, 3 and 4 ft., 2½ in. tread; tires, ⅞ in. steel; hub, 12 in.; three back springs clipped under axle; the two near the wheels, 3 in. wide with 12 plates; center spring, 2½ in. wide with ten plates.

Body—Length, 12 ft. inside; width, 4 ft. 2 in. inside; sills, 1⅜ x 4½ in.; side panel, 1 x 15 in. pine. Hang wagon 24 in. from front of body to center of crossbar. The center bar on top gear should be 4 in. wide and 4½ in. thick, reduced to 3 in. at the ends; 1¼ in. Norway kingbolt as at A; seat, 38 in. high from bottom; sixteen drawbolts as at B; bottom, best oak 1⅛ in. thick, level with sills; 3/16 in. open between boards.



A Four-Ton Truck Body Which Has Neither Mortise, Tenon nor Center Sills

BEST KIND OF FLOORS FOR SMITHSHOP

The writer has been up against all kinds of flooring for smith shops, from the common dirt variety to the best grade of maple. I think the cement floor is about the worst that can be had for a blacksmith shop. It has no resiliency and it is not only hard on the feet and legs but very bad for shoes. Flagstones are very similar; bricks but a slight improvement; and wood, although the most comfortable of all, does not fill the bill on account of its inflammable nature.

For a comfortable, inexpensive floor for a blacksmith shop, earth, or dirt, with wooden platforms on either side of the anvils and in front of benches is hard to beat. It gives to the workmen all the comforts of a wooden floor, and still there is plenty of room on the earth portions to lay hot stock and forgings.

What would seem to be an ideal flooring is a composition that has come into the market in the last seven or eight years. Its principal ingredient is magnesium chloride. To this is added certain dry powders. It is laid plastic in one or two coats about ½ inch in thickness. It dries in a few hours into a lightweight, fireproof, waterproof, seamless, tough, resilient mass which feels to the feet like high grade linoleum. From seven to eight years' wear on floors of this kind shows no perceptible difference, and it is believed that once laid it is good for at least 100 years. The fact that it can be heated to 1,700 deg. F., cooled in water and reheated, would seem to indicate that it is an ideal flooring for blacksmith shops. Its cost, compared with maple flooring, is about double.—Jas. Cran, in American Blacksmith.

THE COLLINGE AXLE

The Collinge axle is perhaps the most elaborate of the usual axles. Its main features are the collet and nuts at the front end. The bush is very similar to that in the mail pattern, as is the wearing surface of the axle, except that the collar is larger than the diameter of the bush which fits into it. It has no back washer or hub bolts, and the bush is held on by the brass collet, which, to prevent it turning, has a flat place in its inner circumference corresponding with a flattened place on the axle. To hold the collet in position, and to adjust it, two brass nuts with opposite threads are fitted, and outside these at the extreme end is a small hole to take a split cotter. A brass cap screwed in the bush retains the oil, and a leather washer is fitted to the collar. This type of axle runs longer than any other without re-oiling, and having no hub bolts is suited to light hubs. Against it must be placed its cost; also, it is not so safe as the mail axle; and the screwed ends are liable to jar off when piecing and setting it.

There are several axles made in the Collinge style, but minus one of the nuts, or the collet, and these are cheaper.

PNEUMATIC SUSPENSION

It may be that a pneumatic suspension like Westinghouse will displace springs. In Europe something similar, the Cowey, is thus described:

Quite the most original car is the Cowey, which is a departure in almost every particular except the engine. All mechanical springing is abolished in favor of the Cowey pneumatic suspension. The four upright tubes, one at each corner of the frame, gave it is a very unique appearance, but it makes the most comfortable springing. Both axles are braced by triangulation, the apices of the triangles overlapping in the center of the car, the arrangement being very similar to a method adopted by Mr. Henry Sutton, of Melbourne, in a car he built in 1898, the arrangement allowing perfectly free lateral oscillation of either axle without frame distortion, and being sound in principle. But perhaps the most strikingly original part of the whole construction is the friction drive, with parallel and nearly flat cones, giving direct clutch drive "on top," with a downward ratio between the shafts obtained by shifting the tailshaft eccentrically.

PRACTICAL SPRING WELDING

The best way to prepare a spring for welding is to upset the ends slightly, punch a small hole in the center and split out the ends ¼ or ⅜ inch long. Then fuller down the scarfs thin on the inside, bending both ends of the scarfs off so that they will dovetail into each other, and hammer down flat at first and then on the edge. The scarfs will draw together and the broken parts will be held tightly by stretching the outside scarfs with the hammer.

The fire should be small and clean, the heat slow, and a very little borax or clean sand may be sprinkled on as the heat begins to rise. When your heat is high enough to fuse, take it to the anvil and tap lightly several times before the sledge is used. Keep spring full in stock and set about ¼ inch between plates.

NO WOOD IN BODY CONSTRUCTION

A development in bodywork is the gradual elimination of wood. This metal panel work is a very good move, and it lends itself to clean design. In some bodies a novel departure is the provision of a leather roller canopy, which pulled out and hitched on to the top of the windscreen to provide protection for the driver in wet weather, and rolled up quite out of sight in the front of the main roof when not in use. In all—or almost all—enclosed cars there is as remarkable an absence of straight lines as of the universality of them on the touring car, and even with bodies built to carry baggage on the roof, the lines of the top fall away fore and aft from the platform. But, while the curve is considered to be the line of beauty, it is not necessarily so.

TEMPERING SPRINGS

Heat to a black hot, and cool in the air until oil will just blaze. Keep adding oil until blaze has disappeared; allow spring to cool, and you have a perfect job.

CASE-HARDENING HEAT

There is no case-hardener that can judge a heat within 50 deg. after it has passed 1,500 deg. F. The daylight each day is different, also a man's eyes differ from day to day.

WILLIAM SPARKS HONORED

William Sparks, of the Sparks-Withington Co., has been elected president of the Chamber of Commerce of Jackson, Mich. As the honor was conferred upon him during his absence, it is evident that the office sought the man.

LAIDLAW, JR., INCORPORATES

William E. Laidlaw, Jr., sole importer of English Burbank motor top cloth and other automobile fabrics, has converted his business into the Laidlaw Co., Inc., under the laws of New York. There will be no change in the personnel.

FIRESTONE MAKING TOUR OF THE WEST

R. J. Firestone, sales manager for the Firestone Tire & Rubber Co., is making a general tour through the western half of the United States. Practically every important city west of the Mississippi is on his route. He left Akron January 16 and will be absent six weeks.

WHEEL PARTS

The dish of the wheel is sometimes utilized to get a wider body, or what is the same thing, a shorter axle between the spring bearing and collar. With a lot of dish there is a greater strain on the tang, so that a round tang, as made by a tanging machine, would be a source of weakness. Therefore, heavy wheels with a lot of dish are better with a square tang, and are made tapered, especially as the felloes of such a wheel are usually wide enough to take a large mortice safely. The tang of a spoke is its weakest part, and the hole made to take it is the weakest part of the felloe, so that it is always a nice problem as to how big the tangs may be made, for by increasing the thickness of the spoke tang we weaken the felloe, and by diminishing it we weaken the spoke.

In driving spokes in the hub the tenon should first be painted, so as to exclude moisture, and this applies particularly to banded hubs, which would otherwise, sooner or later, show rust working out, which looks very bad on a nicely painted vehicle. In an ordinary hub the moisture might cause rot. Paint made of white lead and gold size is a good mixture, but waterproof glue is used. Before driving the spokes, cut the tenons so that they will not rest on the bush after it is fixed, for to preserve the elasticity of the wheel it is essential that the spokes touch neither the bush at one end nor the tire at the other.

Felloes are best made of a timber not liable to split, but they must be tough, tenacious, and elastic. Ash, if good, best meets these requirements, with elm as its best substitute. There is a divergence of opinion as to the grain, which some wheelwrights prefer to follow the sweep of the felloe, while others prefer felloes sawn from straight-grained timber.

Felloes get defective in a variety of ways: some crack across the tang hole, some decay, some fail at the joints, and others split at the ends. Now, if a felloe has the grain following the sweep, the dowel is working directly in the grain, which is more likely to cause splitting and falling at the joint than if the dowel crosses the grain diagonally, as it would in the case of a felloe sawn from straight-grained stuff. In the latter case the fibres of the wood practically represent a number of struts to support the joint. It might appear at first sight that the lower corners would split off, but as the greatest strain is on the top of the joint, this very rarely happens.

GLUE AND GELATIN

The following extracts from a paper read by S. R. Trotman at the Chemical Engineering Exhibition, England, were published in the Oil and Color Trades' Journal:

Many of our important industrial and manufacturing processes were discovered by accident, and improved by experience long before they became of interest to the chemist. The manufacture of glue is a good illustration. Discovered, no doubt, in primaeval kitchens, the successive observations of generations of intelligent cooks have laid the foundations of a great industry which has now a scientific basis.

The principles of the manufacture of glue or gelatin may conveniently be considered under four heads: (1) Glue forming substances; (2) glue stuff; (3) the jelly; (4) the dried jelly or glue.

(1) Glue-giving substances include portions of nearly all animal tissues. While all will give glue, none contain it as such, but a substance termed collagen or ossein, which is changed into glutin or gelatin upon hydrolysis. Thus the manufacture of glue really consists in preparing collagen or ossein in as pure a state as possible, and then transforming this by boiling into glue. In addition to the above mentioned raw materials, considerable quantities of glue-like substances are made from albuminoid bodies such as casein, while scrap or old leather would be a valuable addition to the list if really satisfactory glue could be obtained from it at a reasonable cost. The problem here is, of course, first to reproduce the original raw material without at the same time destroying its glue-giving properties. A process recently invented by the lecturer is interesting in that it detans leather without in any way destroying the skin substance.

(2) The glue stuff is the raw material after it has undergone preliminary treatment to render it fit for the process of boiling, since the raw materials would themselves never give a good glue. As already indicated, the raw material is a very complex mixture of collagen with various impurities, some of which are of value and others not. The valuable impurities are recovered, while the deleterious constituents must be removed. The preparation of the glue stuff from the raw material includes such processes as dehairing, degreasing, washing, liming, deliming, disinfecting and drying.

(3) The jelly is obtained by subjecting the glue stuff to the action of steam or hot water, the action being merely hydrolysis.

Here, too, is largely to be found the difference between gelatin and glue. Gelatin is only distinguished from glue by a greater absence of either nitrogenous or non-nitrogenous non-colloidal impurities. In preparing the jelly from the glue stuff a common fallacy is to suppose that, in addition to glue and gelatin, there is also a substance termed chondrin. What is generally termed chondrin is in reality simply a mixture of ordinary gelatin and mucin. After the cooking or extraction of the glue stuff the subsequent stages in the production of jelly include clarification, filtration, concentration, bleaching and casting, during all of which degradation of nitrogen, either due to chemical or bacterial hydrolysis, may take place.

(4) The glue, or dried jelly, has different properties from the jelly itself, owing to a chemical change taking place during dehydration. Whether this end product be classed as a good or poor glue or a gelatin will largely be determined by the details rather than the principles of the above processes. The valuation of glue is by no means simple, and cannot satisfactorily be done by means of a simple test, either chemical or physical. The only really valuable method of valuing glue is by determining the proportions of nitrogen as gelatin, peptones and lower nitrogenous compounds, combined with the measurement of the consistency of the jelly.

CURING TIMBER WITH "JUICE"

Dr. Nodon, a Frenchman, is using electricity to "cure" timber. He has perfected a process whereby freshly cut wood is seasoned in the space of ten hours. When the planks come from the sawmill they are subjected to an alternating current. Dr. Nodon was assisted by a man named Bretonneau in this process, so throughout Europe it is known as the Nodon-Bretonneau system. The timber is placed in a chemical bath and the reactions remove all sap, substituting borax and rosin in the pores of the wood. The inventors claim that timber so treated becomes harder, easier to work and less warped by moisture than timber that has been seasoned in the old way.

TIMBER SALE METHODS OF GOVERNMENT

The timber sale policy of the forest service is summarized as aiming first of all to prevent losses by fire, and secondly, to utilize the ripe timber which can be marketed. Other aims are: to cut so as to insure restocking and forest permanence; to get the full market value for the timber sold; to prevent speculative acquisition and private monopoly of public timber and to maintain competitive conditions in the lumber industry so far as possible; to provide first for the needs of local communities and industries; to open lands of agricultural value to settlement without allowing them to be tied up by timber speculators; and finally, to secure as soon as possible the cost of production and administration to the government and a

revenue to the national forest states, to which go 25 per cent. of all receipts.

A large number of national forests already more than pay operating expenses. The revenue from the Alaskan forests now exceeds the cost of administration. The same is true generally in the southwest.

A NEW ANZANI BOX TYPE ENGINE

A new four-cylinder engine for cyclecar and light-car work has just been produced by Anzani, the aviation motor specialist, and is being shown to the public for the first time at Paris. The motor is a monobloc casting of 60 mm. by 100 mm. bore and stroke. The cylinders and the crank chamber form a single casting, the bottom of this bloc being closed by the oil pan, which is also of cast iron and bolted to the main casting. Practically all external piping has been abolished, for the exhaust and intake passages are a part of the main casting, the carbureter being on the valve side, and the intake passages surrounded by the exhaust passages, so as to warm the mixture on the way to the intake ports.

A peculiarity of this motor is that the crank and cam shafts are mounted direct in the cast iron bearings of the crank chamber, no bronze or anti-friction lining being used. This is done with a view to low cost of production, but experience has shown that a hardened steel shaft in cast iron bearings is a very satisfactory arrangement. It is not generally known that some of the leading French car manufacturers have mounted cam shafts of big motors in this way for a considerable time. On the rear end of the cam shaft is an eccentric oil pump delivering lubricant to the two main bearings, to the cam shaft bearings, and through oil ways in the cam shaft to the connecting rod ends. The oil filler, which is also a breather, is at the front.

No aluminum is used in this engine. Instead, the whole of the castings are of a very close-grained grey iron, as used for the pistons of aviation motors. The use of cast iron where aluminum is employed on bigger engines does not add much, if any, weight to the complete engine. Practically the whole of the motor, with the exception of the oil pan, being a single-piece casting, a very much neater job is obtained than is possible with detachable cylinders.

Cooling of the engine is by thermo-syphon flow with large diameter pipes, and the water jacket is carried down to the base of the cylinders. The plugs are mounted in the caps over the intake valves. Pet cocks are fitted in the exhaust valve caps. The valve stems are enclosed, and the valve tappets are adjustable. This motor is rated under the French definition as 6-8 horsepower, although the actual power developed is practically double these figures. It is stated that the new Anzani has been designed primarily for cyclecar work, and, in consequence, the design has been simplified to the utmost degree in order to lower the cost of production.

CYCLECAR MAKERS FORM ASSOCIATION

America has a national organization of cyclecar makers, of which W. H. McIntyre has been made first president. Some 30 makers of these vehicles and their accessories named it the Cyclecar Manufacturers' National Association, at a Chicago meeting.

Following the organization a definition of a cyclecar was arrived at, the movement being divided into three branches according to the report and suggestions of a committee, the divisions being as follows:

Vehicle	Motor—Cu. In. Displ.	Weight, lbs.
Cyclecar	to 70	under 750
Light car	70 to 100	under 750 to 950
Small car	100 to 125	950 to 1150

After the definition was arrived at, to know who was eligible to the organization, officers were elected as follows:

President, W. H. McIntyre, Imp Cyclecar Co.; vice-president, Harry Stoops, American Cyclecar Co.; treasurer, J. P. Lavigne, J. P. L. Cyclecar Co., and secretary, William B. Stout, Stout Cyclecar Co.

The definition of a cyclecar was arrived at after considerable discussion by all parties concerned. The committee deciding was made up of men representing all the types of cars and all were very well satisfied with the final recommendations. It is probable that these will be the official definitions of the cyclecar recognized for all American for the future.

The officers of the organization were appointed as a committee, together with Ross Phelps, of the Zip Cyclecar Co., and C. A. Albertus, of the Mercury Cyclecar Co., to draw up the constitution and by-laws for the consideration of the association at a later meeting.

A committee consisting of Phelps, McIntyre and Perry, was appointed to look into the matter of freight rates and classification for cyclecars, makers having now to pay rates very much in excess of other merchandise of the same class, with a minimum weight of 2,000 pounds, in many cases where the cars crated come well under 900.

INCREASE IN HORSE-DRAWN VEHICLES

Number of horse-drawn vehicles licensed for business purposes in 40 cities during 1911 and 1912, showing increase or decrease per cent. (Decrease indicated by —).

Cities	1911	1912	Increase or decrease, per cent.
Albany, N. Y.	355	400	12.6
Ann Arbor, Mich.	63	70	11.1
Atlanta, Ga.	983	1123	14.2
Augusta, Me.	46	48	4.3
Baltimore, Md.	15538	15680	.9
Birmingham, Ala.	429	444	3.4
Boston, Mass.	16656	17100	2.6
Buffalo, N. Y.	11718	11900	1.5
Burlington, Vt.	95	102	7.3
Charleston, S. C.	1050	1099	4.6
Cheyenne, Wy.	30	32	6.6
Chicago, Ill.	55786	55502	—.5
Columbus, O.	13721	12905	—5.9
Dertoit, Mich.	5501	6276	14.0
Duluth, Minn.	1500	1623	8.2
Fall River, Mass.	657	660	.4
Galveston, Texas	1742	2186	25.5
Harrisburg, Pa.	125	128	2.4
Indianapolis, Ind.	9885	8446	—14.5
Milwaukee, Wis.	428	449	4.8
Mobile, Ala.	1311	1320	.6
Montreal, Can.	15700	17878	13.8
Nashville, Tenn.	1659	1957	17.9
New York, N. Y.	20594	20425	—.8
Norfolk, Va.	1502	1600	6.5
Omaha, Neb.	550	538	—2.1
Ottawa, Can.	629	676	6.9
Pittsburg, Pa.	10003	11148	11.4
Providence, R. I.	7864	9044	15.0
Raleigh, N. C.	200	225	12.5
Richmond, Va.	3452	3514	1.7
St. Louis, Mo.	22810	22250	—2.4
Salt Lake City, Utah	510	1055	106.8
San Francisco, Cal.	11389	10834	—4.8
Spokane, Wash.	468	475	1.4
Syracuse, N. Y.	494	520	5.2
Tacoma, Wash.	208	221	6.2
Vancouver, B. C.	538	622	15.6
Winnipeg, Manitoba	1982	2313	16.7
Worcester, Mass.	681	788	15.7

TO ASSEMBLE GRAMM TRUCKS IN TACOMA

According to Tacoma (Wash.) advices, the erection of a garage and assembling plant for the Gramm-Bernstein Motor Truck Co. has been commenced at South Seventh and C streets in that city. The structure will be of brick, 60 x 100 feet. The first floor will be utilized as a salesroom and the second as an assembling plant and machine shop, in which, it is stated, at least eight trucks per week will be assembled.

TOTAL VALUE OF FARM PRODUCTION OF 1913 BREAKS RECORD

In monetary value of products the farms of the United States have broken the annual record, although the volume of production, as indicated in the secretary's report, was materially below the average. The total value for 1913 is $9,750,000,000, nearly one-half a billion dollars above the value for 1912, which was itself a record year. This amount is composed of estimates for the items that make the census total of farm products. It is far from being equivalent to the total sales of farm products, but its items are the values of farm crops, of farm animals sold and slaughtered, and of farm-animal products. A sum of such elements is to be accepted as an index number, useful for comparison with numbers similarly made for other years. If the value of the products of the farm for the census year 1909 is regarded as represented by 100, the corresponding value for 1913 is represented by 115; or, if 100 represents the value of farm products for the census year 1899, the index number for 1913 is 207, indicating more than twice the value of the former year, 14 years earlier.

The crops of 1913 have an estimated value at the farm of $6,100,000,000, and this amount has never before been equaled. In 1909 the value of crops was about 5¾ billions, and in 1899 it was 3 billions of dollars, or less than half of the crop of 1913.

The estimated value of farm animals sold and slaughtered and of farm-animal products for 1913 is $3,650,000,000, or $100,000,000 above the amount of the record year 1910. It compares with 3 billion dollars for 1909 and with more than 1¾ billion dollars in 1899. Within the last few years the value of farm animals sold and slaughtered and of farm-animal products for one year has tended to increase in a somewhat greater degree than that of farm crops.

TIRE SURGERY

Surgery, when applied to rubber tires is a sure cure for the disorders that attack them. Like hospital attention to the ills of man, if the necessary surgical operations are put off, even for a day, the malady will make such inroads that the patient will ever after live in a state of delicate health, assuming that the attack may not prove fatal.

A great variety of mushroom growths have fondness for cotton, of which the fabric of the casings of tires is made. These growths belong to the family of mildew; a growth of minute powdery or webby fungi. These fungi are whitish, or vari-colored. They perpetuate in the carcasses of decaying vegetation. In fine, these fungi are feeding upon the vegetation when it is said to be undergoing decay.

In order to thwart the designs of the millions of fungi which are to be found in every pool of water by the roadside, it is necessary to prevent them from getting their teeth into the fabric of the tires. This is easily done. The plan is to heal every little wound as soon as it appears on the surface of the tires. The coating of "gum," made from the latex of the rubber tree, hardened and toughened by suitable applications of curing substances, as sulphur and other compounds, is proof against the burglars among mildew fungi.

The rubber of the tire performs several functions, but none are more important than the one of warding off mildew. Tire surgery, under the circumstances, is a very important profession. Promptness is more than half of the battle. Seal up the wounds before the mildew penetrates the fabric. Seal them out; not in.

PRICE TENDENCIES

The common phenomenon of record yield and crop value below the record, and of record crop value with low production is presented by more than half a dozen of the crops of 1913. If the farmer gets a high price, perhaps a very high price, per bushel or other unit of quantity in case of a crop of low production, on the other hand he usually gets but low prices for the crops which he produces in abundance.

The prices of 14 principal crops average about 20.2 per cent. higher than a year ago and 4.6 per cent. higher than two years ago. Their total values average about 3.8 per cent. higher than a year ago and 7.6 per cent. higher than two years ago. Hence aggregate production averaged about 13.6 per cent. less than a year ago and 2.9 per cent. more than two years ago.

The general level of farm prices of staple crops decreased approximately 0.9 per cent. from November 1 to December 1. Last year from November 1 to December 1 there was a decline in price level of 6.8 per cent., and for the last five years there has been an average decline in price level from November 1 to December 1 of 2.9 per cent. The average level of prices on December 1 was about 20.3 per cent. higher than on December 1 last year, 0.3 per cent. lower than two years ago (the year in which crop production was smaller than this year), and 9.3 per cent. higher than the average of the last five years on December 1.

A TRADE JOURNAL TELLS OF BUENOS AIRES

F. F. Cutler has been looking about the earth to see how people used boots and shoes, and what the trade chances were. This is how he speaks of the Argentine:

"How many North Americans know that Buenos Aires, the capital of Argentina, is the largest city in the world south of the equator; that it is the second Latin city ranking after Paris, in all the world; that it has a population of nearly 1,500,000 and is growing faster than any city in the United States except possibly New York or Chicago?

"If surprised at this statement you might be interested to know that in Buenos Aires is the finest and costliest structure in the world, used exclusively by one newspaper, the home of La Prensa, the most magnificent opera house in the western hemisphere, costing more than $10,000,000 and erected by the government; the handsomest and largest club house in the world—that of the Jockey Club; the most extensive system of artificial docks in all America, representing an expenditure of $50,000,000 several years ago, and new docks are now under construction which will cost $22,000,000 more."

A GREAT LEATHER MARKET

The tanning industry is closely connected with Chicago's earliest history, for tanneries were established there in the early forties and today they have 24 tanneries producing annually about $24,000,000 worth of leather. Twelve of these produce leather for the shoe trade and eight for the glove trade, while the others manufacture leather for various other lines.

The annual sales of leather are approximately 20 per cent. of the nation's production of leather.

As this country is one of the largest producers of hides and skins, it may appear strange to many that the home supply is not adequate for the requirements of trade in this country and that there is annually imported from $90,000,000 to $100,000,000 of raw hides and skins.

COUNTING THE COST

When the parcels post law went into effect it was found necessary to supplement the delivery service of the post office in Indianapolis, and for this purpose two electric delivery wagons were rented. They were placed in service along with two gas delivery wagons, which later were removed from the service as a result of the cost investigations made by the department.

It was found that whereas the gasoline vehicles were delivering 136 packages in 135 stops during the 8½-hour day, the electrics were delivering 271.5 packages in 189 stops during a

7-hour day; the mileage of the gasoline vehicles was 45.6 and of the electrics, 18.75. The cost of the day's run in the case of the electrics figured out at $5.60, whereas the gasoline vehicles cost $8.50. The stops per mile were 2.94 in the case of the gas vehicle as against 6.02 for the electrics and the cost per stop in cents was 6.36 for the gasoline cars and 3.26 for the electrics. The actual cost per parcel delivered worked out at 6.30 cents with the gas cars and 2.06 cents with the electrics.

THE FIVE STRIKING FEATURES OF KEROSENE CARBURETERS

As a commercial proposition, the five most striking features of the kerosene carbureter are:

(1) The low cost of fuel, which at present averages one-half as much as with gasoline. With a car using gasoline at the rate of one gallon per 20 miles, gasoline costing 18 cents, the cost of fuel is 0.90 cent per mile. With a car using kerosene at the rate of one gallon per 21 miles, kerosene costing 9 cents, the cost for fuel is 0.43 cent per mile. This makes the fuel cost 52 per cent. lower with kerosene than with gasoline.

(2) Increased power, from 5 to 8 per cent.

(3) A saving of about one-half in the amount of lubricating oil required, as kerosene is itself a lubricant.

(4) Less spark plug trouble on account of the kerosene carbon being drier and finer.

(5) A slightly greater mileage per gallon than with a gasoline carbureter.

Its two most serious deficiencies would seem to be:

(1) The necessary use of two fuels at present.

(2) The necessity, if applied to automobile motors already produced, of reducing the compression to 40 pounds, to prevent pounding under extreme conditions.

COMMERCIAL TRAVELERS IN SOUTH AMERICA

Taxes imposed by South American countries on commercial travelers are far from being prohibitive to the average exporter. While various license fees are prescribed by law in those countries, their purpose, as explained in a report just issued by the Bureau of Foreign and Domestic Commerce of the Department of Commerce, is chiefly to prevent unfair competition with local concerns, which are themselves subject to similar taxes. By associating himself with some local house, the traveler may obtain exemption from all but a few of the more moderate taxes. The rates of license fees and the conditions under which samples may be temporarily admitted free of duty in practically all the countries of South America are shown in the report entitled "Commercial Travelers and Samples in South America" (Tariff Series No. 19A), copies of which may be purchased for 5 cents each from the Superintendent of Documents, Government Printing Office. (Postage stamps not accepted.)

MENDING DRAFTING TOOLS

To mend broken drafting triangles and other celluloid articles use three parts alcohol and four parts ether mixed together and applied to the facture with a brush until the edges become warm. The edges are then stuck together, and left to dry for at least 24 hours.

2. Camphor, one part; alcohol, four parts. Dissolve and add equal quantity (by weight) of shellac to this solution.

3. If firmness is desired in putting celluloid on wood, tin, etc., the following gluing agent is recommended, viz.: A compound of two parts shellac, three parts spirit of camphor, and four parts strong alcohol.

4. Shellac, 2 oz.; spirits of camphor, 2 oz.; alcohol, 90 per cent., 6 to 8 oz.

RESEARCH BRINGS RICH REWARD

Nothing more interesting in the making of springs will be found than the small bound volume issued by the Perfection Spring Co., of Cleveland, O. The work is intended for the owner, but everyone who touches the motor car from any of its angles of interest will find this little book one great pleasure which we will not anticipate by exploiting its contents.

SETH M. NONES RESIGNS

Seth M. Nones, vice-president and general manager of the Kentucky Wagon Mfg. Co., son of W. C. Nones, chairman of the board of directors of that corporation, has resigned. Mr. Nones had been identified with the wagon company for 12 or 15 years and at one time was mentioned as the successor to his father who held the office of president.

SELLS ITS BIG WAGON PLANT

H. L. McClaren, president of the Mitchell-Lewis Motor Co., Racine, Wis., announced February 11 the company has sold its wagon plant. This sale will result in releasing for use in the financing of the motor car manufacture approximately $2,000,000, which had been invested in the wagon business.

THE VEHICLE YEAR BOOK FOR 1914

The Ware Bros. Company has, as customary, issued its Vehicle Year Book for 1914. The features that have become familiar are to be found done with customary skill, and the book is a desirable acquisition as a reference book in the office.

RECORD JANUARY BUSINESS

President R. V. Board, of the Kentucky Wagon Mfg. Co., stated recently that the company's business for January was nearly twice that for the corresponding month in any of several years past, the demand being unusually good for the season.

WILL HANDLE WHITE LINE

The Geo. White Buggy Co., Rock Island, Ill., announces a new selling arrangement under which the B. F. Avery & Sons Plow Co., of Dallas, Tex., will handle the White line of vehicles in the Lone Star state.

GOOD AND BAD ROADS

Col. Bailey has been appointed chairman of the "good roads committee" of the Electric Vehicle Association, "not because he knows anything about good roads, but because he knows much about bad roads."

RECEIVER WILL PAY DIVIDEND

Robert P. Hargitt, receiver of the Continental Carriage Co., reported to the insolvency court January 29 that the assets inventory $34,739.73. He was ordered to pay a 28 per cent. dividend.

BOSTON SHOW

The Boston Automobile Show has passed the doubtful period. It is an assured success. The truck show will be like unto it. All feel very happy over the outlook in Boston.

Bright steel screws and other articles can be "blued" by the simple process of holding them on a piece of sheet iron over a fire until they assume the desired hue.

OBITUARY

L. S. Bartley, 72, formerly connected with the Noyes Carriage Co., at Elkhart, Ind., passed away at Dezarn, Ky., January 24. He had been in ill health for some months.

George Haskell, 71, a retired carriage manufacturer of Philadelphia, died February 6, at his home on Penarth road, Cynwyd, Pa. Uremia was the cause of death. Mr. Haskell was born in Philadelphia. Early in life he entered the carriage shops of his father, Ebenezer Haskell, in Arch street. At the opening of the Civil War he joined a Pennsylvania regiment of volunteers and saw service in the Quartermaster's Department of that regiment. When the war was over he reentered the carriage business, and at his father's retirement, took charge of the business. For years it was carried on under the name of Haskell Brothers, at 1712 Fairmount avenue. He retired 13 years ago. His widow and two sons, George L. Haskell and C. Wilfred Haskell, survive.

James A. Haskell, 34, traveling salesman for the Cortland (N. Y.) Cart & Carriage Co., was among the passengers of the Old Dominion Line steamer Monroe who lost their lives on January 30, when that boat was rammed amidships by the Merchants and Miners liner Nantucket. Mr. Haskell had been on a business trip south.

A. E. Lasnier, former owner of the Hannibal (Mo.) Wagon Co., died in Concordia, Kas., January 30. Mr. Lasnier established the factory several years ago, and built it into a business of considerable proportions. Two years ago he sold his interests to the present owner and moved to Kansas, where he has since resided. He is survived by the widow; there are no children.

Rodney M. Nelson, 57, for many years general foreman at the John Immel & Son Carriage Co., Columbus, O., died January 8, after a long illness. Mr. Nelson was forced to give up his work because of failing health about four years ago. Tuberculosis caused his death. His widow and three sons survive.

Charles H. Walker, who for many years conducted the Walker carriage factory in the village of Rye, near Port Chester, N. Y., died January 15, after a lingering illness. He leaves a son, who is one of the foremost surgeons of Westchester county, besides several other children.

John H. Wilson, 97, president and founder of the Wilson-Moline Buggy Co., at Moline, Ill., died January 21, at his home in Pomona, Cal. Mr. Wilson had spent the winter in the western state for the last eight or ten years. Usually it was his custom to return to his home at Moline each summer, but for the last two years he remained west. Mr. Wilson was born in Mercerburg, Pa. Soon after moving to Moline he founded the Wilson-Moline Buggy Co., which ceased manufacture during 1913, buildings and realty being sold to the Sechler company. He also was connected with other local enterprises, and his activities in the business affairs of the community are well known to older residents. Deceased is survived by the widow and two daughters.

DEATH OF JOHN H. SCHUMANN

John H. Schumann, Sr., aged 74, for half a century engaged in the varnish manufacturing business in Brooklyn, N. Y., died Wednesday, December 31, after a long illness, at his home, 847 Prospect place, Brooklyn. Mr. Schumann had not been active in the business for the past four years, although he had always kept in almost daily touch with the office.

Mr. Schumann since withdrawing from active interest in the company had been devoting much of his time to the German Savings Bank of Brooklyn, of which he was president, and to his other banking connections.

John H. Schumann was born in Manheim, Germany, January 29, 1840, coming to this country about 60 years ago. In 1863, under the firm name of Moller, Knaepp & Co., he started in the varnish manufacturing business on the north side of Brooklyn. After about six months he and Mr. Moller bought out the entire business and continued on the north side until 1878, when the present large plant on Marcy avenue was built. In 1910 Mr. Schumann gave over the management of the plant to his four sons, and the concern has since been known as the Moller & Schumann Company.

When the Hon. Seth Low was mayor of the city Mr. Schuman was civil service commissioner under him.

Mr. Schumann was well known in banking, fraternal and civic circles, and was president of the German Savings Bank of Brooklyn, and a director of the Title Guarantee and Trust Co. and the Citizens' Trust Co. He was also a charter member and vice-president of the Broadway Bank, which was later merged into the Citizens' Trust Co. He was also a charter members of the Manufacturers' Association of New York, in which he was active for years.

DEATH OF DR. WORRALL

Rev. John M. Worrall, chaplain of the C. B. N. A., has yielded to an attack of pneumonia. He was in his 88th year.

For many years Mr. Worrall has been known as the chaplain of the Carriage Builders' National Association, having been elected to that office in 1880, when the convention was held in Chicago.

NEW COLUMBUS BUGGY CO. STOPS SHORT

The new Columbus Buggy Co., organized by the creditors, came to a sudden stop in its operations on February 5 and will not start again until plans have been made for further financing.

The company, under the present management, was incorporated January 24 for $500,000 by creditors who purchased the plant for $310,000 when it went into bankruptcy in Federal court last summer. The appraised value of the plant is $675,000.

According to estimates by officers it will be necessary to raise in the neighborhood of $300,000 to continue the business. This will have to be raised by a mortgage on the property or by some other methods as present stockholders have stated that they do not feel that they can advance the cash.

All of the employes were paid in full and told they would be notified when the plant would again begin operation, which is now indefinite, according to Secretary Postlewaite.

It was stated that the company at present had funds to continue for a short time, but that the present officers did not feel that they should continue without making more plans for the future.

The new company is officered as follows: President, George W. Lattimer; vice-president, E. R. Sharp; secretary, D. N. Postlewaite, and treasurer, George W. Bright.

The following directors were chosen: O. A. Miller, George W. Lattimer, George W. Bright, E. R. Sharp, F. O. Schoedinger, Robert Jeffrey and T. J. Cavanaugh.

Four directors of the newly organized company, consisting of the creditors of the old company, tendered their resignations on February 5, to take effect immediately. They were O. A. Miller, Robert Jeffrey, F. O. Schoedinger and G. E. Cavanaugh of St. Louis.

A statement was made that the company had over $60,000 worth of unfilled orders on its books, but was unable to go ahead owing to the report of the accountant that $300,000 would be necessary to handle the business and to put the company on a footing. Inability of the directors to raise money through sale of stock or borrowing money on the strength of the orders now on hand is said to be the reason

for the shutdown. The banks are said to have refused to make further loans also.

It is rumored that the business will not be continued but offered for sale immediately, in order to wind up the affairs of the unfortunate company.

Fifty men were put back to work on February 7 to finish up orders on hand.

T. C. Dunlap, B. G. Watson and D. N. Postlewaite were elected to fill the places made vacant by Robert Jeffrey, O. A. Miller, F. O. Schoedinger and T. J. Kavanaugh of St. Louis, who resigned as directors owing to the condition of finances of the reorganized company. They will serve until final disposition of the affairs of the company is made.

LA PORTE CARRIAGE COMPANY TROUBLES

The decision of the United States district court of Indianapolis, Ind., dismissing the bankruptcy petition filed against the La Porte Carriage Co., La Porte, Ind., about two years ago, has been affirmed by the United States court of appeals. This decision was based upon another finding of the court to the effect that the company is solvent. When this decision was first rendered, two of the petitioning creditors appealed, but the United States circuit court of appeals now holds that their claims are without merit.

On February 12, Orville E. Truesdell was appointed receiver for the La Porte (Ind.) Carriage Co. by Federal Judge Anderson. The assets and liabilities were not scheduled, but it was said were about $100,000 each. J. J. Parkhurst is the president and principal stockholder.

GOODRICH 1913 PROFITS $2,600,000

According to a preliminary report of the B. F. Goodrich Co., of Akron, O., its profits for the year 1913 were approximately $2,600,000, after making proper allowances for maintenance, depreciation and other things. Added to the surplus carried over, the Goodrich undivided profits will be about $700,000 after paying the full year's dividend on the preferred and one per cent. on the common.

The quick assets of the company on December 31 last were, in round figures, $20,000,000, and its current liabilities $4,000,000. The preliminary report states that the company has no bonded debt and no need for the new financing, and adds that "adverse operating conditions encountered during the year, resulting in decreased income, will be dealt with in the annual report."

RECEIVER NAMED FOR R. MILTON NORRIS CO.

Upon the admission of inability to meet its obligations in the course of business, although alleging to have assets sufficient to cover all claims, the R. Milton Norris Co., dealers in wagons and wagon supplies at Baltimore, Md., agreed on February 2 to the appointment of William E. Byrd as receiver. Bond was given for $60,000.

The failure of the company to raise money needed to carry on the business caused the directors at a recent meeting to decide to submit to the appointment of a receiver, if necessary, and upon the application of R. Milton Norris, a creditor and large stockholder, this was done. The papers show that the capital stock of the company is $100,000, the assets $67,426 and the liabilities $34,305.

WAGON TRADE FLOURISHING

The directors of the Owensboro Wagon Co., Owensboro, Ky., held their annual meeting at the factory January 21 and declared the usual semi-annual dividend. Reports were made showing the flourishing condition of the company, and of the great success made during the past year.

The factory resumed operation shortly after the holidays, after making its annual inventory, and the indications point to the present year as being a record breaking one.

W. A. Steele, secretary and manager, stated that the prospects were never better for the largest business in the history of the company. Orders are coming in for immediate and future shipments, and the conditions are favorable for an immense business this season.

BANNER BUGGY CO. NOW OPERATING NEW BODY PLANT

The new buggy body plant of the Banner Buggy Co., one of the most complete of its kind in the country, has commenced operations. Over $100,000 have been spent on it, and it is one of the most modern in every respect. With the additional force employed in its operation it will make the total number of employes on the Banner Buggy Co. pay roll about 1,800. The company had a most prosperous year during 1913. The sales were over $1,000,000 greater than during the year 1912.

HAVE CHANGED POSITIONS

Harry Allen, formerly chief draftsman, Pope Mfg. Co., Hartford, Conn., is now designing engineer for the Field Omnibus Co., New York City.

G. S. Porter, formerly manager hub department, Hayes Wheel Co., Albion, Mich., is now with the Jackson Rim Co., Jackson, Mich.

Clyde L. Ritter, formerly draftsman, Velie Motor Vehicle Co., Moline, Ill., is now with the Thomas B. Jeffery Co., Kenosha, Wis.

PAY DIVIDEND AND MAY ENLARGE PLANT

Officers were reelected at the annual meeting of the Michigan Hearse and Carriage Co., Grand Rapids, Mich., as follows: President, Alvah W. Brown; vice-president, William F. McKnight; secretary and treasurer, A. C. Chapman. The officers, with H. C. Cornelius and T. F. O'Brien, constitute the directorate. The company declared a 10 per cent. dividend and increased business may result in enlargement of the factory this year.

INCORPORATED TO MAKE WHEELS

Fahrney Wheel Corporation, Timberville, Va., capital $1,000,000, to establish plant to manufacture wheels.

Gay-Streibich Auto Wheel Co., Little Rock, Ark., capital $125,000; Geo. R. Gay, president.

Rene Wheel Co., Chicago; capital $2,500; manufacturing automobiles, auto wheels, accessories, etc.; incorporators, Edgar Thereault, George Gagne, Lee D. Mathies.

C. E. SOVEREIGN CO. CHANGE

The C. E. Sovereign Co., of Rockford, Ill., have filed notice of dissolution in the office of the secretary of state. The dissolution of the corporation means no change in the business, as Mr. Sovereign has practically been running the business alone for some time. He caused the dissolution because there was practically no advantage in corporation. The company is engaged in the manufacturing of neck yokes and leather goods.

REPUBLIC RUBBER TO INCREASE CAPITAL

In addition to a preliminary resolution providing for the retirement of $2,500,000 of its preferred stock and refunding it under a new issue, the Republic Rubber Co., of Youngstown, O., has voted to increase its capital. The exact amount of the new issue, however, has not yet been determined.

Trade News From Near and Far

BUSINESS CHANGES

W. J. McGinley has purchased the business of V. Pruyn, in Douglas, Neb.

James Law has been succeeded in business in Audubon, Ia., by R. J. Nelson.

C. G. Trant has purchased the business of S. D. Swayne, in Guthrie Center, Ia.

J. B. McElwain has been succeeded in business in Kenwood, Ia., by Carl & Vogt.

L. D. Milliken has succeded to the business of Pearce & Milliken, in Ord, Neb.

John Davis has been succeeded in business in Deer Creek, Minn., by John Menge.

Geo. J. Jackson has succeeded to the business of Jackson & Rennick, in Nelson, Neb.

Kirk & Matthews have succeeded to the business of A. E. Kirk, in Clearwater, Kas.

Bruner & Bickel have succeeded to the business of George H. Brunner, in Vinton, Ia.

The carriage plant of Brown Bros. is being moved from Bristol to Elizabethton, Va.

C. A. Summers has disposed of his stock of buggies, etc., in Byron, Neb., to Fred Peters.

A. G. Larson has disposed of his stock of vehicles, etc., in Spencer, Ia., to Knight Bros.

Meeting Bros. have purchased the R. G. Tuggle stock of vehicles, etc., in Verden, Okla.

Smith Brothers have succeeded Kelley & Mather in the vehicle business in Cadillac, Mich.

W. B. Tenant has purchased the J. E. Chandler stock of buggies, etc., in Berwyn, Neb.

L. J. Golden has purchased the Woodson-Albert Co. stock of vehicles at Harrisonburg, Va.

Chas. Roscall has purchased the stock of vehicles, etc., of B. P. Hollister, in Cleburne, Kas.

Boyer & Horton have disposed of their stock of vehicles, etc., in Lake Park, Ia., to Alfred Jones.

A. J. Roe has purchased the stock of buggies and implements of W. H. Green, in Creighton, Neb.

A. B. Martin & Co. have purchased the Swain stock of vehicles, hardware, etc., in Parnell, Mo.

W. I. Norris has purchased the stock of vehicles, etc., of A. S. J. Aycock, in Farmersville, Tex.

Bruce & Co. have been succeeded in the vehicle and hardware business in Winside, Neb., by C. E. Benshoff.

J. L. Blanchard has purchased the stock of F. E. Bear, in Kinsley, Kas., and will move it to Byron, Okla.

J. E. Palmer, of San Antonio, has purchased the J. Q. Wheeler stock of vehicles and harness at Kerrville, Tex.

F. E. Prickett & Co. have succeeded to the stock of carriages and hardware of Prickett & Hutchinson, in Fayette, O.

The Hanson & Johnson Implement Co. has purchased the stock of buggies, etc., of F. B. Dells, in Black River Falls, Wis.

The Whittier (Cal.) Implement Co. has bought the carriage, wagon and farm implement stock of William Volkmor, of the same place.

R. D. Sayres & Co., Dayton, Wash., who have been conducting a vehicle and implement business in connection with a general store, are closing out their vehicle, implement and hardware departments.

Dudley White, who has been with the E. F. Parks buggy, saddlery and furniture business at Bryan, Tex., for two and a half years, has purchased an interest in the business. The style of the new firm will be E. F. Parks & Co.

Chas. A. Peirceall has bought an interest in the blacksmith and wagon shop heretofore owned by Pierceall & Drescher, at Monroe City, Ill., and the firm is now Pierceall & Son. C. L. Drescher retires from the firm but will continue to work for the new firm.

E. Loucks & Co., Schenectady, N. Y., for more than 30 years engaged in the manufacture of wagons, sleighs and motor delivery bodies, has been dissolved, Mr. Wesley Loucks retiring on account of advanced age. Mr. Elmer E. Loucks will continue the business.

The Youngstown (O.) Carriage & Wagon Co. has been succeeded by the Youngstown Carriage Co. With the exception of W. A. Castner, superintendent, the reorganized concern is made up of the same stockholders that controlled the destinies of the old Youngstown Carriage & Wagon Co.

Baker & Hamilton, dealers in vehicles, farm implements, hardware, etc., with headquarters in San Francisco and a factory at Benicia, Cal., are closing out their branch store at Sacramento, Cal., and will hereafter handle their business for the whole of California from their large store and warehouse in San Francisco.

The vehicle and implement firm of Miller & Quayle, Eugene, Ore., has been dissolved. Mr. Miller will retire from the business, his interest having been bought by Mr. Quayle, who will associate his two sons with him in the business, and will change the name to the Quayle Co. Mr. Quayle states that the new company will soon build a large repository and store of brick or concrete.

NEW FIRMS AND INCORPORATIONS

Geo. M. Ross has opened a new wagon repair shop in Fulton, W. Va.

Nichols & Son have opened up a stock of vehicles, etc., in Atoka, Okla.

E. E. Vance has opened a new stock of buggies, etc., in Pewamo, Mich.

J. H. Bricker has opened a vehicle and implement business at Abilene, Kas.

W. W. Groves has opened up a new stock of vehicles, etc., in Nampa, Idaho.

W. M. Stebbins has opened a new stock of buggies, etc., in Gothenburg, Neb.

C. J. Gesme has opened a stock of vehicles and hardware in Morristown, S. D.

The Forked Leaf Oak Co. is to establish a wagon factory in Heber Springs, Ark.

Hall & Hall have engaged in the vehicle and implement business in Nelson, Neb.

Will Thompson is opening a stock of implements and buggies in Saterville, Kas.

Hudson & Donegan are opening a stock of buggies, wagons, etc., in Dickson, Tenn.

Newton & DeHay are engaging in the vehicle and implement business in Olustee, Okla.

Cole & Welms have engaged in the vehicle and implement business in Roseland, Neb.

J. L. Blanchard, of Kinsley, Kas., has opened a new stock of vehicles in Byron, Okla.

J. S. Randolph & Sons, of Gulfport, Miss., are reported about to put in machinery for making wagons.

The Peterson Bolster Spring Co. has been incorporated in Racine, Wis., with a capital stock of $125,000.

H. M. Wheeler and J. C. Jones are about to erect a buggy and automobile body factory in Jonesville, La.

Ochener & Weber are about to erect a building in Fort Madison, Ia., and will put in a stock of vehicles, etc.

The W. E. Shook Buggy Co. has been incorporated at Springfield, Mo., with a capital of $3,000, to deal in vehicles.

The Lightsey Bros. Hardware Co., which has just been incorporated in Fairfax, S. C., will handle a line of vehicles.

The National Body Co., Rahway, N. J., has been formed with a capital stock of $10,000, to build automobiles and wagon bodies.

The Berckley Buggy Co., of Martinsburg, W. Va., has been incorporated with a capital of $25,000, by D. W. Shaffer and others.

The Peter Reidenbach Wagon Works, 164 Eldridge street, New York City has been incorporated with a capital stock of $10,000.

The Laux Carriage Co. has been organized at Kansas City, Mo., with a capital of $8,000 by C. A. Laux, W. W. Foalson and J. E. Willetts.

The Lewisburg (Tenn.) Carriage Co. has been organized with a capital stock of $10,000, by W. L. Regen, W. A. Bills, A. V. McLane and G. B. Markham.

The Planters Hardware and Vehicle Co., Inc., has been incorporated at King's Mountain, N. C., with a capital of $15,000, by E. L. Ware, J. T. Welch, Ben. D. Phifer.

Brown & Robb Co., Gloucester City, N. J., to manufacture automobiles, wagons, trucks, etc., capital $100,000, has been incorporated by E. R. Brown, T. H. Robb, H. Johnson.

Keystone Vehicle Co., Columbus, O., to manufacture vehicles, has been incorporated by H. E. Sullivan, W. D. Sullivan, E. C. Bates, W. H. Bates and S. L. McMillan; capital stock, $15,000.

J. S. Randolph & Sons, who have just entered business at Gulfport, Miss., are planning to install a large amount of new wagon building machinery. Besides general wagon work, automobile and carriage painting and upholstery will be among the specialties.

IMPROVEMENTS AND EXTENSIONS

Keller & McSweeney have moved their stock into a new building in Carson, Ia.

The Glencoe Hardware & Implement Co., of Glencoe, Okla., has leased additional room for its vehicle department.

Herman Lutter has contracted for the erection of a wagon factory at 141 and 143 Frelinghysen avenue, Newark, N. J., which will cost $4,200.

The Wheeler & Wilson Buggy Mfg. Co., Natchez, Miss., has purchased a 43-acre site there for a factory and also will serve electric lights to the town.

Edgar Bros., vehicle and implement dealers operating a chain of five stores in the extreme southern end of California, are now erecting at El Centro, in the Imperial Valley, a large brick carriage and implement repository.

FIRES

A recent fire destroyed the stock of vehicles, etc., of J. A. Folbeck, in Terrill, Ia.

The stock of vehicles, etc., of J. F. Landers & Co., in Roxton, Tex., has been burned.

The carriage warehouse of the W. J. Hefler Hardware & Implement Co., in Texola, Tex., has been burned.

The plant of the Laross Buggy Co. at Grinnell, Ia., was destroyed by fire, February 8. Loss about $60,000; insurance about $35,000. It is said the company will rebuild promptly. The plant had been quite busy up to the time of the fire.

MICHIGAN BUGGY CO.'S HIGH FINANCE DEALS

Nearly every one connected with the industry has at least a fairly good idea of the remarkable high financing which kept the Michigan Buggy Co., of Kalamazoo, affoat until the crash came on August 6 last; but it was not until the receiver, the Detroit Trust Co., through its vice-president, Joseph Bower, issued a report to the creditors the latter part of January that the many ramifications were fully disclosed.

While it was already known that undated dealers' accommodation notes to a large amount had been made use of, Bower's investigation uncovered the fact that, apart from those which had been negotiated, the Michigan company had attempted to fortify its future with almost literally a bale of such paper. He found signed but undated notes of the sort bearing the names of 16 Michigan buggy dealers and distributors, to the amount of more than $2,462,000, of which Dewey & Co., who handled the Michigan car in the little town of Plano, Ill., furnished more than $1,000,000 forth.

It was believed that there were many other notes of this nature but they could not be found. None of them had been entered on the books, but nothing serves better to show how the Michigan officials proposed to keep their rotten ship afloat. When the company failed, its liabilities were placed at approximately $3,000,000, to say nothing of the $1,000,000 debts accumulated by Victor L. Palmer, its secretary-treasurer, who later was personally forced into bankruptcy. As originally reported, the company's assets were $2,780,000, which the first appraisal scaled down to the sum of $1,260,000.

According to the receiver's report, while the Michigan Buggy Co.'s statement of January 31, 1913, which is used for the purpose of comparison, charged off five per cent. of what is termed balance of accounts receivable, the investigation indicates that it is more likely that from 60 to 70 per cent. of the entire debt balance should be charged off, in view of statements made by creditors concerning their indebtedness.

The January 31 statement shows that items carried as merchandise sales were also included in the inventory, but this is difficult to prove owing to the fact that many of the inventory books giving physical details have disappeared.

On January 16 the grand jury returned indictments against Moses Henry Lane, once president of the company, Frank B. Lay, Sr., head of the concern at the time of its collapse, and Victor L. Palmer, secretary-treasurer of the company, in 31 counts, charging them with issuing preferred stock in an alleged illegal manner.

CHANGE IN PEKIN WAGON CO. MANAGEMENT

W. A. Ebbert has resigned the position of vice-president and general manager of the Pekin Wagon Co., Pekin, Ill. Mr. Ebbert has made no plans for the future, but expects to continue in the wagon trade. He has had a long experience in this line and enjoys a large trade acquaintance.

Mr. Ebbert's successor as vice-president is Adam Saal. Other officers elected at the recent annual meeting of the company were as follows: President, H. G. Herget; treasurer, U. J. Albertsen; secretary, Henry Birkenbusch. The above, with Louis J. Albertsen, W. P. Herget and D. D. Velde constitute the board of directors.

IMPORTANT POSITION FOR DAYTONIAN

Winthrop Moore Daniels, son of one of the founders of the Pinneo & Daniels Wheel Co., of Dayton, O., has been nominated by President Wilson to fill one of the two vacancies on the interstate commerce commission.

Up until the time Wilson was elected governor of New Jersey, Mr. Daniels was a professor at Princeton university, and at that time he was appointed to a place on the New Jersey public utilities commission by Wilson.

VEHICLE TRACKS IN SOUTH AMERICA

Venezuela—Few roads. Most of the interior traffic on the backs of mules. Vehicles employed are of foreign manufacture, generally American. The width of the ruts in the roads surrounding Maracaibo measure 4 ft. 6 in. to 4 ft. 8 in.

Uruguay has about 5,000 miles of roads, and the system is being expanded. Standard tracks are used as is general in the United States. Montevideo street car tracks 5 ft. from out to out. Many vehicles are made to suit this width.

Paraguay—Standard, same as in the United States, 4 ft. 8 in. for carriages, and 5 ft. 2 in. for wagons on country roads, measured out to out.

Peru—The usual tread of vehicles is about 4 ft. 1 in. Most carriages used are imported, but some native carts and wagons are built.

Ecuador—Few roads in Ecuador, and most in bad condition. Aside from a few two-wheeled carts in the cities and on the plantations of native make, the vehicles are imported from the United States and Europe, and have the standard width of the countries from which they come. The axles of the native carts are usually imported.

Brazil—In Rio de Janeiro, the imported vehicles are same in gauge as in the countries from which they come. In country districts practically the only vehicles used are the small two-wheel cart called "carroca." These carts have a width of 4 ft. 6 in., out to out.

Argentina—The general width of the road tracks is 5 ft. 2 in. for the country as a whole, but north of the Province of Santa Fe many of the tracks are 4 ft. 8 in. Vehicles are built as in the United States and Europe. The trolley tracks are generally standard gauge, 4 ft. 8½ in.

In Buenos Aires, Rosario, Cordoba and other large cities, automobiles are numerous. The domestic builders of wagons produce vehicles of modern design.

TIMKEN PLANT INCREASES CAPITAL

The capital stock of the Timken-Detroit Axle Co., of Detroit, a sister corporation of the Timken Roller Bearing Co., of Canton, has been increased from $942,000 to $3,000,000, according to an Associated Press dispatch.

The increase in the capital stock is to provide for increased business and to take care of enlargements at the plant which have been under way for some time.

WANTS

Help and situation wanted advertisements, 1 cent a word; all other advertisements in this department, 5 cents a word; initials and figures count as words. Minimum price, 30 cents for each advertisement.

PATENTS

Patents—H. W. T. Jenner, patent attorney and mechanical expert, 606 F St., Washington, D. C. Established 1883. I make a free examination and report if a patent can be had and exactly what it will cost. Send for circular.

FOR SALE

For Sale—Elliott Dash Stitching Machine, in good running order. Will stitch new as well as old dashes, sleigh wings, and fenders. In fact will stitch on all kinds of leather work. John C. Meyer Thread Works, Lowell, Mass.

SITUATIONS WANTED

Carriage trimmer or painter, work at either or both. Albert A. Herman, 1749 Union street, Indianapolis, Ind.

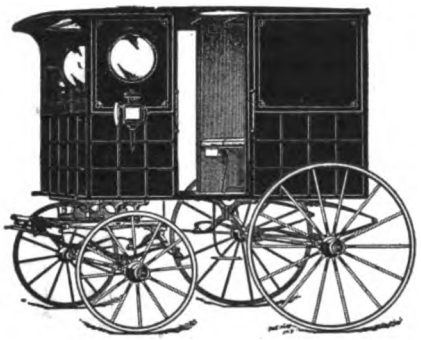
Salesman (25), competent, energetic and efficient; traveled three years; am thoroughly conversant with the vehicle wheel line and heavy hardware line. Desire permanent connection with some reputable manufacturer or jobber where opportunity offers. Highest references. Address Traveler, care The Hub.

SOMETHING FOR SO-CALLED GERMAN- AMERICANS TO READ

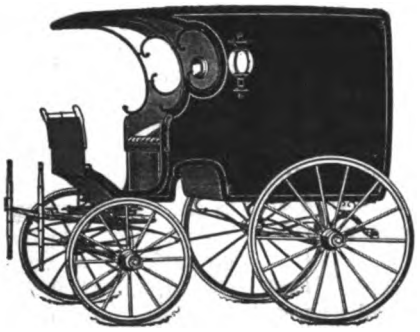
Germany stands today second only to the United Kingdom in being the world's greatest merchant, exceeding the combined imports and exports of the United States by $410,000,000 per annum. Here is a country scarcely the size of Texas, with 66,000,000 inhabitants to support, with no generous gifts from Nature, a country which has not yet celebrated her fiftieth anniversary of its present union, taking one of the foremost ranks in the world's trade.

And what has put Germany in this enviable position? To be sure, it has not been helped by a protective tariff nor by this self-satisfied feeling that foreign trade could not establish itself in its domains. It has been a careful application to its various tasks; a theoretical study of all that it undertakes, a careful analysis of its various business undertakings, a smooth running political machinery and economy and an everlasting study of the world's markets and how best to utilize them.

INDEX TO ADVERTISERS

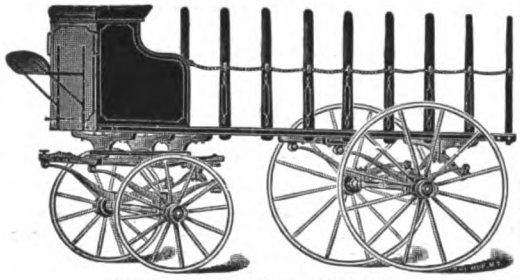


No. 112.—Milk Wagon.

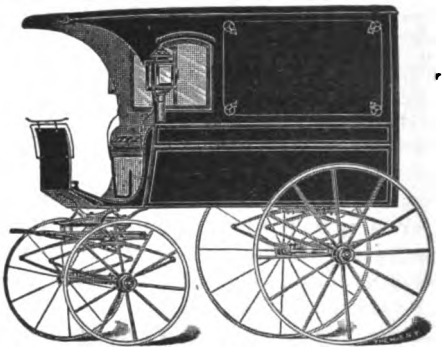


No. 111.—Altman Wagon.

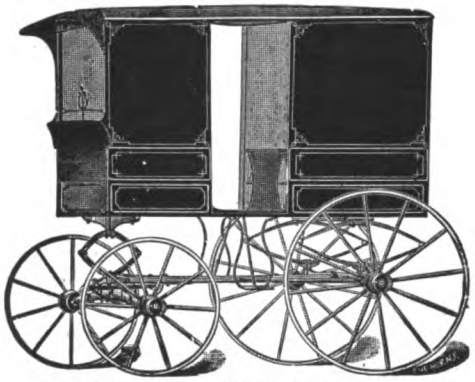
No. 113.—Grocery Wagon.



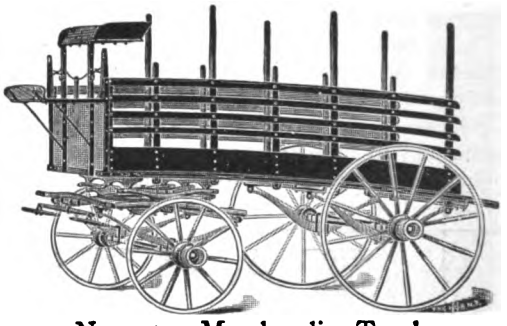
No. 122.—Flour Truck.



No. 115.—Delivery Wagon.

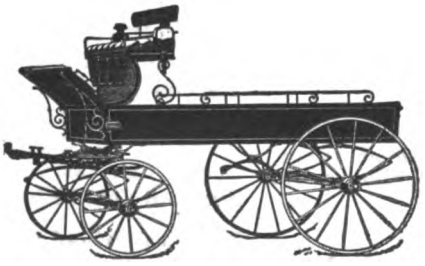


No. 116.—Milk Wagon.

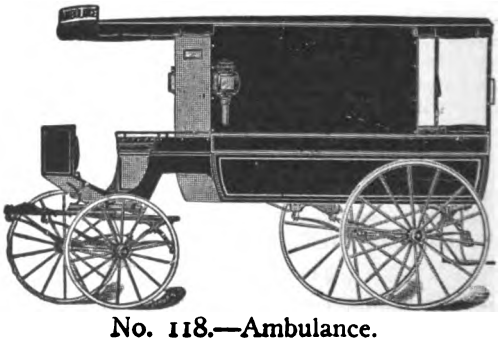


No. 117.—Merchandise Truck.

No. 114.—Delivery Wagon.

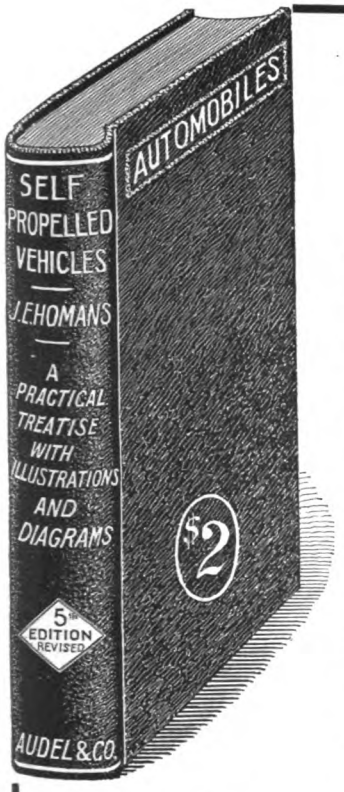


No. 124.—Delivery Wagon.



No. 118.—Ambulance.

BUSY BUYERS BRIEFS



"Self-Propelled Vehicles"

Fifth Edition, Revised.

A practical treatise on the theory, construction, operation, care and management of all kinds of Automobiles.

By

JAMES E. HOMANS, A.M.

Contains 608 pages and upwards of 500 illustrations and diagrams, giving the essential details of construction and many important points on the successful operation of the various types of motor carriages driven by steam, gasoline and electricity.

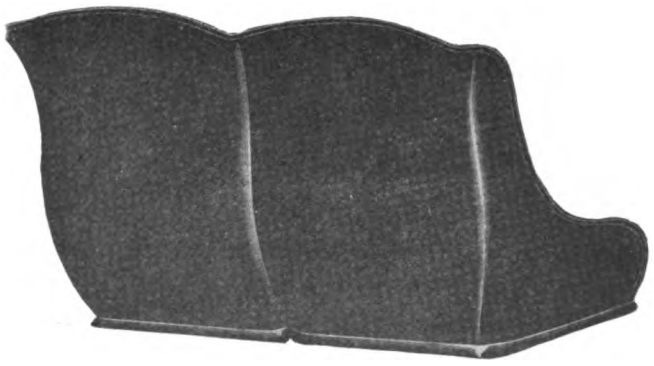
This work is now the accepted standard, explaining the principles of construction and operation in a clear and helpful way. This book will be sent postpaid to any address in the United States, Mexico or Canada upon receipt of $2.00.

Address

Trade News Publishing Co.

24 Murray Street, New York

Lawson's Sunken Panel, Twin Metal Buggy Seats



The Strongest—Neatest on the Market

Made in six sizes and of either 22 or 20 gauge automobile sheet metal. The Lawson seats are edged and bumped together by heavy presses.

We Use No Solder

Our seats were never known to come apart or rumble.

Write for Prices

The F. H. Lawson Co.

(Established 1816)

Cincinnati - - - Ohio

1855—Standard for 59 Years—1914

Jones Wheels

"Best on Earth"

The Name of Jones as Applied to Wheels Means the

First, Last and All-the-Time Word in Wheels

"Kantsamore"

Buyers of vehicles should say, "Give me wheels made by

Phineas Jones & Co.

NEWARK NEW JERSEY U. S. A.

High Grade Motor Truck SPRINGS

THE PERFECTION SPRING CO.

Cleveland, Ohio.

Established 1886

Correspondence School of Carriage and Motor Carriage Drafting

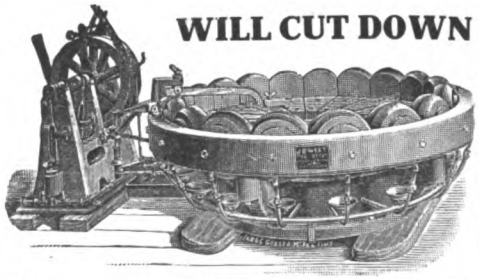
A thorough, practical tuition is given through this correspondence school. The theory and practice of construction, bookkeeping, perspective. Many men now hold good positions through taking the courses of instruction.

Principal, THOS. MATTISON,
Hillside Avenue, Bitterne Park,
Southampton, England

Author of "The Coach Body Makers' Guide," $3.00; a practical treatise on "The Suspension of Carriages," "Bookkeeping," and other carriage building works.

The WEST Hydraulic Tire Setter

WILL CUT DOWN EXPENSE



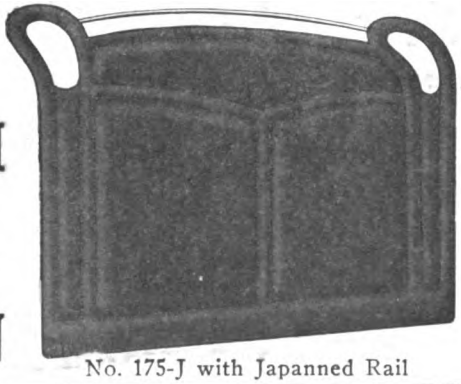
Tires set cold in one minute. This machine saves time—does the work better and quicker, does away with burned streaks. Only necessary to measure one wheel in a lot. Does not char the rim, and thus make the tire loosen prematurely.

Saves resandpapering of wheels. This machine is now increasing the profits of many manufacturers. Send for catalog and read about it.

WEST TIRE SETTER CO., ROCHESTER, NEW YORK

McKINNON DASH COMPANY

Try Our No. 175 J. DASH For Your 1914 ROAD WAGON



No. 175-J with Japanned Rail

BUFFALO, N. Y.

TROY, OHIO ST. CATHARINES,
CINCINNATI, OHIO ONTARIO

Remember to Call for

JAPANNED RAIL PADDED DASHES

For All Vehicles

"BLACK VELVET" CUSHION SPRINGS

Manufactured Only by the

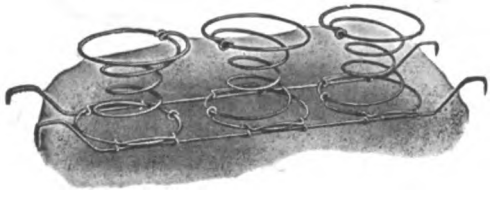
NATIONAL SPRING AND WIRE COMPANY

ALBION, MICH. WINDSOR, ONT.

THE SPRING OF QUALITY.

SPRING or SOFT EDGE CUSHION FRAME

For Buggies or Other Vehicles. Built of the Highest Grade of Steel Wire.



STRIP FOR WOOD OR BOX FRAME

WILLEY'S COLORS

The RECOGNIZED STANDARD

C. A. WILLEY CO.

COLOR GRINDERS

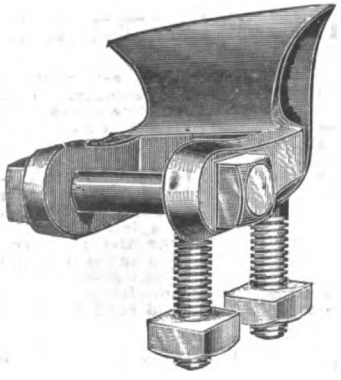
and Manufacturers of Specialties in

CARRIAGE, AUTOMOBILE AND CAR

PAINTS

COLORS, VARNISHES, ETC.

HUNTER'S POINT, NEW YORK CITY



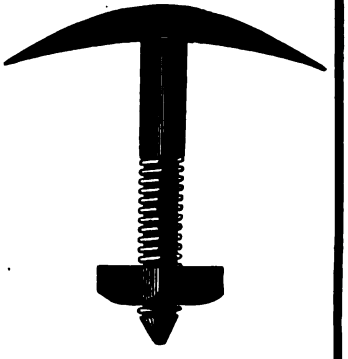
Skewed Shaft Couplings

Regular or Oval Patterns
For High Arched Axles

Furnished in rights and lefts for any height of arch. Oval Axle Clips ⅝ or ¾ width to match Oval Couplings. Bolts, Clips, Couplings, Carriage Hardware and Special Forgings

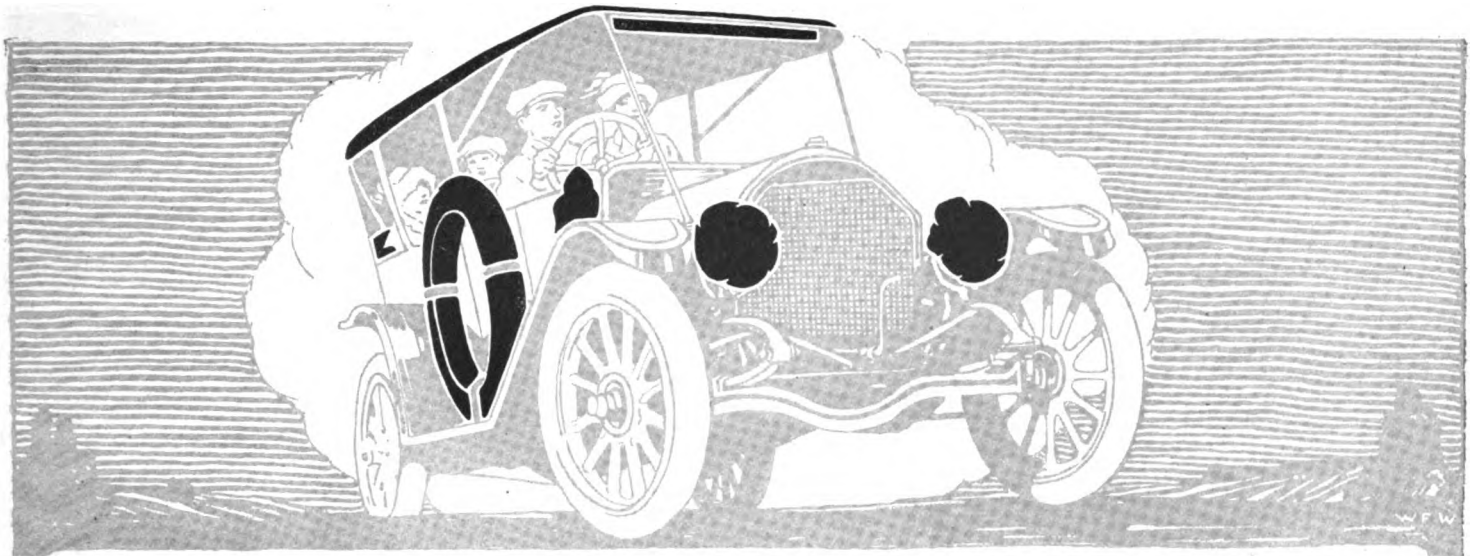
Catalogue "H" and Prices on Application

COLUMBUS BOLT WORKS, Columbus, O.



The Hub

TRADE NEWS PUBLISHING COMPANY
24-26 MURRAY ST. NEW YORK



MERITAS
LEATHER CLOTH
THE LEADING LEATHER SUBSTITUTE

Recently a manufacturer said: "I didn't think anybody could make an artificial leather cloth that would look so much like the real thing until I saw MERITAS LEATHER CLOTH."

That's the situation with dozens of carriage and auto builders.

We are ready to submit samples of MERITAS LEATHER CLOTH that will convince you we can save you money on your upholsterings, trimmings, curtains, etc.

MERITAS LEATHER CLOTH is being successfully used by manufacturers of carriage and auto accessories such as lamp covers, tire cases, trunks, storm aprons, buggy boots, etc.

Made in muslin, duck and drill, dull and glazed, smooth and grained, in black and colors.

Write us your requirements.

STANDARD OIL CLOTH CO.

320 BROADWAY, NEW YORK

The Hub

Entered in the New York Post Office as Second-class Matter

Vol. LV MARCH, 1914 No. 12

THE TRADE NEWS PUBLISHING CO. OF N. Y.
Publishers of THE HUB

J. H. WRIGHT, *President.* G. A. TANNER, *Secretary and Treasurer.*
24-26 MURRAY STREET, NEW YORK.

Other Publications of Trade News Publishing Co.:
HARNESS (monthly).....per year, $1.00
AMERICAN HARNESS AND SADDLERY DIRECTORY (annual).....per copy, $4.00

THE HUB is published monthly in the interest of employers and workmen connected with the manufacture of Carriages, Wagons, Sleighs, Automobiles and the Accessory trades, and also in the interest of Dealers.

Subscription price for the United States, Mexico, Cuba, Porto Rico, Guam, the Philippines, and the Hawaiian Islands, $2.00, Canada, $2.50, *payable strictly in advance.* Single copies, 25 cents. Remittances at risk of subscriber, unless by registered letter, or by draft, check, express or post-office order, payable to the order of TRADE NEWS PUBLISHING CO.

For advertising rates, apply to the Publishers. Advertisements must be acceptable in every respect. Copy for new advertisements must be received by the 25th of the preceding month, and requests to alter or discontinue advertisements must be received before the 12th day of the preceding month to insure attention in the following number. All communications must be accompanied by the full name and address of writer.

FOREIGN REPRESENTATIVES:

FRANCE.—L. Dupont, publisher of *Le Guide due Carrossier,* 78 Rue Boissiere, **Paris. Subscription price, 15 francs, postpaid.**

GERMANY—Gustave Miesen, Bohn a Rh. Subscription price, 12 marks, postpaid

ENGLAND.—Thomas Mattison, "Floriana," Hillside Avenue, Bitterne Park, Southampton. Subscription price, 12 shillings, postpaid.

Entered in the New York Post Office as Second-class Matter.

Results Coming Forward

More than a year ago the editor of The Hub asked the Department of Labor, Bureau of Foreign and Domestic Commerce, if it would not be possible to have the consuls gather data all over the world as to the tracks of horsed vehicles, styles of bodies, height of wheels, and such other information of value, easily compiled when the machinery is so effective as the consular service can supply.

The Hub communicated its plan to the C. B. N. A. It was thought good, and a committee was appointed, including The Hub, to foster the plan, and let the Department know such information would be valuable to the builder, and most appreciated.

The Department has finally received reports from all commercial lands, from its trained observers, and this mass of manuscript is to be sent about the country in two sections according to the annexed schedule:

PART 1

New York—February 20 to March 13: Branch office of Bureau of Foreign and Domestic Commerce, 315 Custom House.

Chicago—March 16 to April 3: Branch office of Bureau of Foreign and Domestic Commerce, 629 Federal Building.

Cincinnati—April 6 to April 25 (both parts): Chamber of Commerce and Merchants' Exchange.

New Orleans—April 29 to May 9: Branch office of Foreign and Domestic Commerce, Association of Commerce.

San Francisco—May 13 to May 23: Branch office of Bureau of Foreign and Domestic Commerce, Appraisers' Warehouse Building, Washington and Center streets.

Countries covered in Part 1: Austria-Hungary, Belgium, Denmark, England, France, Germany, Greece, Ireland, Italy, Malta, Netherlands, Norway, Portugal, Russia, Scotland, Servia, Spain, Sweden, Switzerland, Turkey, Wales.

PART 2

Chicago—February 20 to March 13: Branch office of Bureau of Foreign and Domestic Commerce, 629 Federal Building.

New York—March 16 to April 3: Branch office of Bureau of Foreign and Domestic Commerce, 315 Custom House.

Cincinnati—April 6 to April 25 (both parts): Chamber of Commerce and Merchants' Exchange.

San Francisco—April 29 to May 9: Branch office of Bureau of Foreign and Domestic Commerce, Appraisers' Warehouse Building, Washington and Center streets.

New Orleans—May 13 to May 23: Branch office of Bureau of Foreign and Domestic Commerce, Association of Commerce.

Countries covered in Part 2: Canada, Mexico, St. Pierre Island. Central America: British Honduras, Costa Rica, Guatemala, Honduras, Nicaragua, Panama, Salvador. West Indies Bermuda, Cuba, British West Indies, Dominican Republic, Dutch West Indies, French West Indies, Haiti. South America: Argentina, Brazil, Chile, Colombia, Ecuador, Guiana, Paraguay, Peru, Uruguay, Venezuela. Asia: Arabia, Ceylon, China, India, Java, Japan, Siam, Siberia, Straits Settlements, Turkey in Asia. Africa: Algeria, Egypt, Kongo, Liberia, Madagascar, Morocco, Portugese East Africa, Tripoli, Union of South Africa, West Africa, Zanzibar. Oceania: Australia, New Zealand, Samoa, Society Islands.

It will be seen that the itinerary of the documents is not very happy or well planned for the use and information of builders, but we are informed by Chief Baldwin that the documents, eventually, will be sent anywhere on demand for inspection of those in interest who are missed by the schedule announced above; and we may say that is about 80 per cent. of the trade that it is sought to benefit.

We learn, too, that when the subject is somewhat staled by time, the trade periodicals may be permitted to extract and print data.

This would have been the most effective move for thorough publicity to have taken as the first step, and we are sorry for the sake of all in interest the Department did not share that view.

It Was a Sorry Sight

The recent snow storm in New York was accompanied with quite a degree of frost, so "the beautiful" lay about in great piles, much to the discouragement of traffic.

The occasion was a Waterloo for the horseless vehicle, especially the commercial truck, which was practically put out of commission. The wheels revolved, yes, but

all the chains, and even blankets spread over the surface of the snow were not the means to make them budge.

It was comical to watch it all, but when you think of the awful burden placed upon those who must, as a means to a living, declare, demonstrate and prove the horse is now a mere useless ornament, it loses somewhat of the fun element.

The motor truck was distinctly found wanting in coping with conditions that may recur any and every winter. In some cases its impotency was a menace, as for instance when horses had to be hitched to a motor fire apparatus to pull it out of a stall to a fire, after much loss of the kind of time that means something serious.

Altogether the instance under the observation of New Yorkers has been a severe black eye to the claims of the commercial truck.

An Important Meeting

The Second Annual Meeting of the Chamber of Commerce of the United States of America performed a service of importance, for it brought together definite national opinion on anti-trust legislation. Speeches were delivered by Hon. Wm. C. Redfield, Secretary of Commerce; President Charles R. Van Hise, University of Wisconsin; Victor Morawetz, New York City; Frederick P. Fish, former president American Telephone and Telegraph Co.; Henry R. Towne, president Yale & Towne Manufacturing Co.; Prof. Henry R. Seager, Columbia University, N. Y.; Guy E. Tripp, chairman board of directors Westinghouse Electric and Manufacturing Co.; and Louis D. Brandeis, Boston, Mass. The result of these speeches, as reprinted in whole or in part, has been to provoke immediate nation-wide discussion of the questions involved in proposed bills in Congress that embrace, in their scope, amendments to the Sherman Law, additions to the Sherman Law, definitions under the Sherman Law, prohibition of interlocking directorates, and extended powers of the Interstate Commerce Commission over the issue of railroad stocks and bonds.

An immediate result of the second annual meeting was a resolution instructing the president of the Chamber of Commerce of the United States to appoint a special committee of not less than seven members to consider all proposed antitrust legislation, and to make preparations for immediately taking a nation-wide referendum through the commercial organizations of the United States.

The Eye-Opened Owner

The following excerpt from a letter found in an automobile journal is symptomatic, we would infer. The owner is counting the cost, and wondering why he isn't getting more for his money.

"Since the day has arrived when one automobile manufacturer, at least, has admitted clearing from $20,000,000 to $25,000,000 in one year, I think it is time for the automobile owners, who have made all this possible, to pause and consider what they get for their money.

"Since 1902 I have been the owner of five automobiles, for which I paid $5,175, and on which the repairs and depreciation alone have amounted to $4,000. My repairs have cost me very little in comparison to some owners, as I have had only minor accidents, and most of my repair work has been done by my own help.

"Expensive service stations, with marble floors, hardwood fittings and furniture, and agents' commissions all increase the cost of the car to the man who pays the freight.

"Pure petrolatum, such as is sold in drug stores for medicinal purposes, costs 4 or 5 cents a pound in large quantities, but the cruder form, when put in a can with a fancy label, is sold to the motorist for 20 to 25 cents a pound.

"Evidently there is too much profit and too little real value in most cars or they would not depreciate as rapidly as they do at present. The only axe I have to grind is to secure in common with other motor users, more service and satisfaction for my money."

The Difference Between Now and Then

In the old times the spring maker bought his steel from the steel maker on an analysis, then went about making springs. When they were made, sometimes they were tested, sometimes not.

How different it is now since the laboratory worker has so much to say about it. The steel from the mill is put through a scientific "third degree," and asked more questions by means of the most complicated laboratory apparatus, than were ever thought of or known by the old-time spring maker.

Probably the costs have been much enhanced, but it is also patent that never before were such fine vehicle springs produced. All along the line the grade has been raised; even the buggy builder has had a share of this spring usufruct. The springing of the buggy is better than it ever was, although not very necessary, as such high grade material can be dispensed with in the horsed vehicle that is trundled along at moderate speeds.

However, it has been a fine development. We know more about metals than ever before, and we welcome the scientist "in our midst."

Here and There

An automobile journal makes its leading article a write-up of Gray & Davis. The new plant in Boston is the text, and it is elaborated like the firstlys and secondlys of a sermon. We just mention this for the sake of calling to mind the progress this concern has made since the time, not long ago, when they were unconsidered little lamp makers down in Amesbury. All that is needed is ability, opportunity and—a winner.

* * *

It is said that the farmer farms on a basis that is 40 per cent. as efficient as the average that is realizable. The maker of "goods" is 50 per cent. as efficient as the realized maximum. Looks as if the farmer was catching up mighty fast, and was no longer in the hayseed class.

The Agricultural Department may be blamed for most of this!

* * *

Listen to this from one of the high priests of the industry. He was talking to a committee at Washington, and, of course, wanted something: "The automobile industry has wasted a larger sum of money through preventable waste than it has realized in tangible profits. We are not meeting competition from foreign countries. For instance, America is importing 70 per cent. of its ball bearings which are made in Germany. The reason is that American industries are so inefficient on that article that they are unable to meet the competition of Germany. We are compelled to pay a uniform price to the various manufacturers of ball bearings, and that with the recognition of the German government."

* * *

Mr. Lucking, a director of the Ford Co., is thus quoted from an automobile paper: "Competition among manufacturers is such that to live at all, a manufacturer has got to keep his price down. In Detroit they have been falling by the wayside. Millions have been invested and lost there. I do not know how many failures there were last year, but there were many."

* * *

Disraeli says: Men are not the creatures of circumstances, circumstances are the creatures of men.

This is one of those glittering generalities that sound so well, but are so misleading. Concrete example: a lost chance to secure the trade of a new dealer by not getting the facts in time.

* * *

England supplies one-third and America one-quarter of the total sales of automobiles in Australia.

NUTSHELL TRUTH

It was only yesterday that many vehicle men, both builders and dealers, were going about with their faces clouded with sadness and the general demeanor which folk assume when about to bury some dear friend. Some self-elected prophets, who claimed they had been to the top of Mount Sinai, or had received definite information on the subject from another source, declared that the day of the horse-drawn vehicle was over. A few even went so far as to say that within a comparatively few years "man's best friend, the horse," would become practically extinct; and the jokesmiths, not to be outdone, made sport of the noble horse by picturing him as a rare animal to be seen only in zoological parks.

What nonsense—to permit a bugaboo to blight business! While it is true that the advent of the motor into the vehicle business curtailed the demand for higher priced carriages, the major patr of the demand for automobiles came from people who had not heretofore owned a conveyance of any kind.

The real injury to the vehicle business, says Canadian Implement and Vehicle Trade, was not caused by the motor, but by the vehicle men themselves. This statement may probably sound strange to many and requires an explanation. Neither the carriage dealers, the local builders, nor the wholesale manufacturers have ever been what might be considered creative business builders of the highest type. They supplied a demand, but they did little or nothing to create that demand. If a prospective customer called on a carriage dealer, that gentleman did his best to make a sale. There were very few dealers who did anything to develop in the minds of the public a desire for carriages in general or for their particular carriages.

The wholesale manufacturers maintained a selling force which called on the dealers, and these salesmen did their level best to interest the dealers in the line of vehicles which they sold. But neither the manufacturer nor his salesmen did anything worth mentioning toward helping the dealer to sell his goods. They probably argued that vehicles were a stable commodity; that the public knew whether it wanted vehicles or not; and if it did, it would go to the dealer's place without being driven there.

WORKING DRAFT OF AN EXTRA WIDTH BUGGY

With Auto Top, and Elliptic Springs Suspension

Design by E. L. Bare, student in the C. B. N. A. School for Carriage Draftsmen, New York
(See illustration)

The dimensions for length of body are of medium size, but of extra width. The body is of the ordinary construction. The extension bow in the front is a good feature. It is covered with cloth or rubber of minimum thickness, and when not in use can be folded up so as to be unnoticed.

Wide Seat a Feature

The principal point is made of an exceptionally wide seat. The length from dash to front of seat is 24½ in., the seat frame is 17 in., and amount of rear flare of the seat is 2½ in. The flare of the back is ¾ in. The distance from undersurface of sill to undersurface of seat is 11 in., depth of side quarter 9¾ in., depth of back from undersurface of seat to top is 21 in.

Widths across body and seat: Across bottom, 27 in.; across top of side panel, 28 in.; across undersurface of side quarter, 36 in.; and across top, 38½ in.

Construction of Seat

The seat panels are ⅞ thick when dressed, and are joined at the corner by corner blocks glued in each corner and then rounded by a one inch radius.

The panels are set into a rabbet in the seat frame, and screwed from the bottom, as shown on the front view.

The back is constructed at the corner same as that of the seat, and is then set on top of the seat panels and supported by three brackets, as is also shown on drawing.

Dimensions of Wheels

Diameter of hubs and length, 3½ x 6; diameter of hub bands, front and back, 2⅝ x 2 15/16; thickness and width of spokes, 1 x 11/16; thickness and depth of rims, 1 x 1 1/16; amount of stagger front and back, ⅜ x ½. Steel tire for ⅞ tread.

One Front Elliptic Spring

Length from centers of heads, 35 in.; open out to out, 8 in.; width of plates, 1¼ in.; number of plates, 4; thickness of main plate, No. 2; thickness of other plates, No. 2.3.3. Clipped top and bottom.

One Rear Elliptic Spring

Length from centers of heads, 35 in.; open out to out, 9¼ in.; width of plates, 1¼ in.; number of plates, 4; thickness of main plate, No. 2; thickness of other plates, No. 2.3.3. Clipped top and bottom.

The axles, front and back, are half patent, fantail style. Size at square ends, ⅞ in.; size at center, 1¼ x 11/16 in.; width of track, front and back, 4 ft. 7 in.

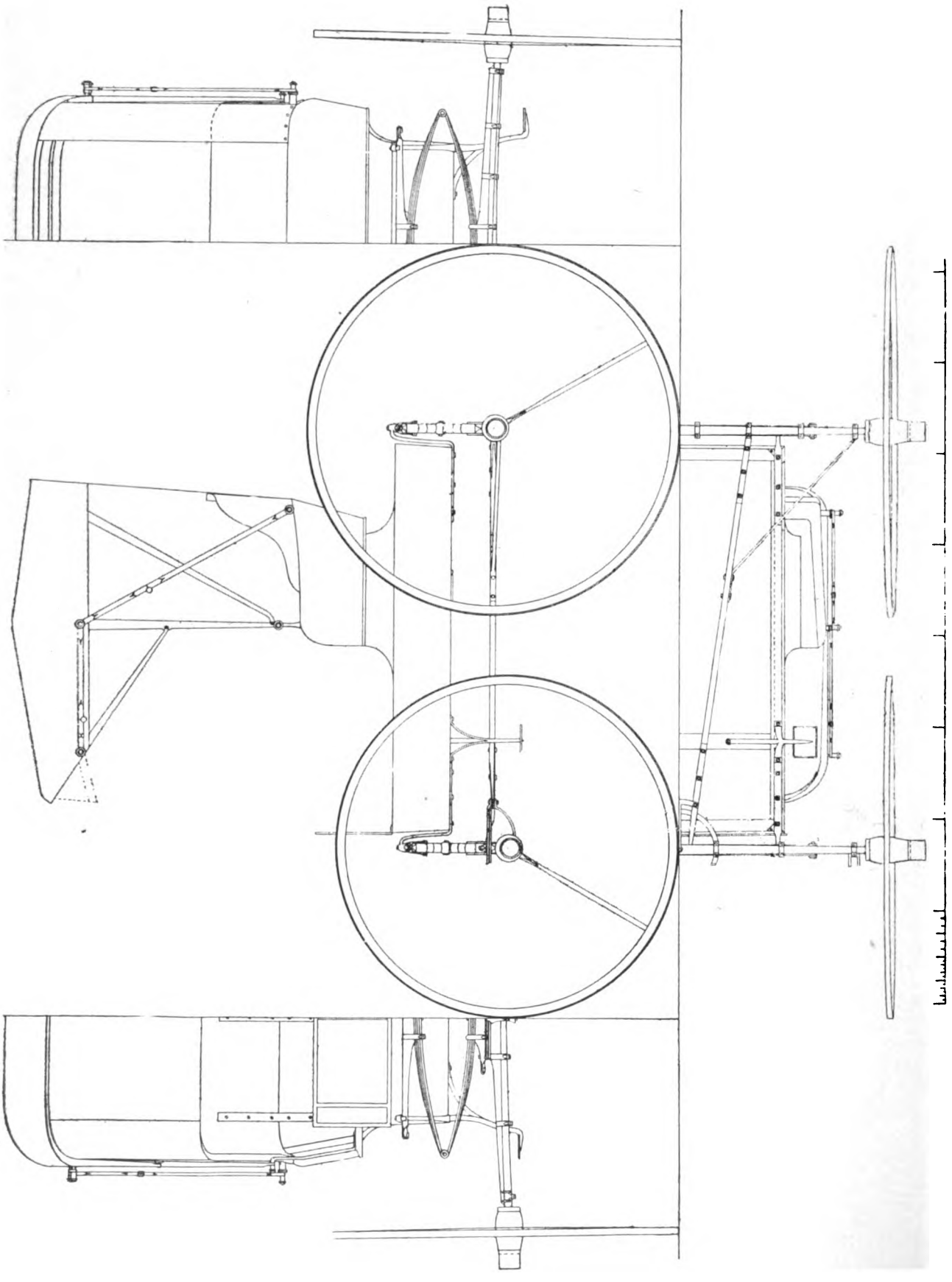
The body width across bottom is 27 in.; across top of riser, 32 in.

The width of seat across bottom is 36 in.; across top, 38½ inches.

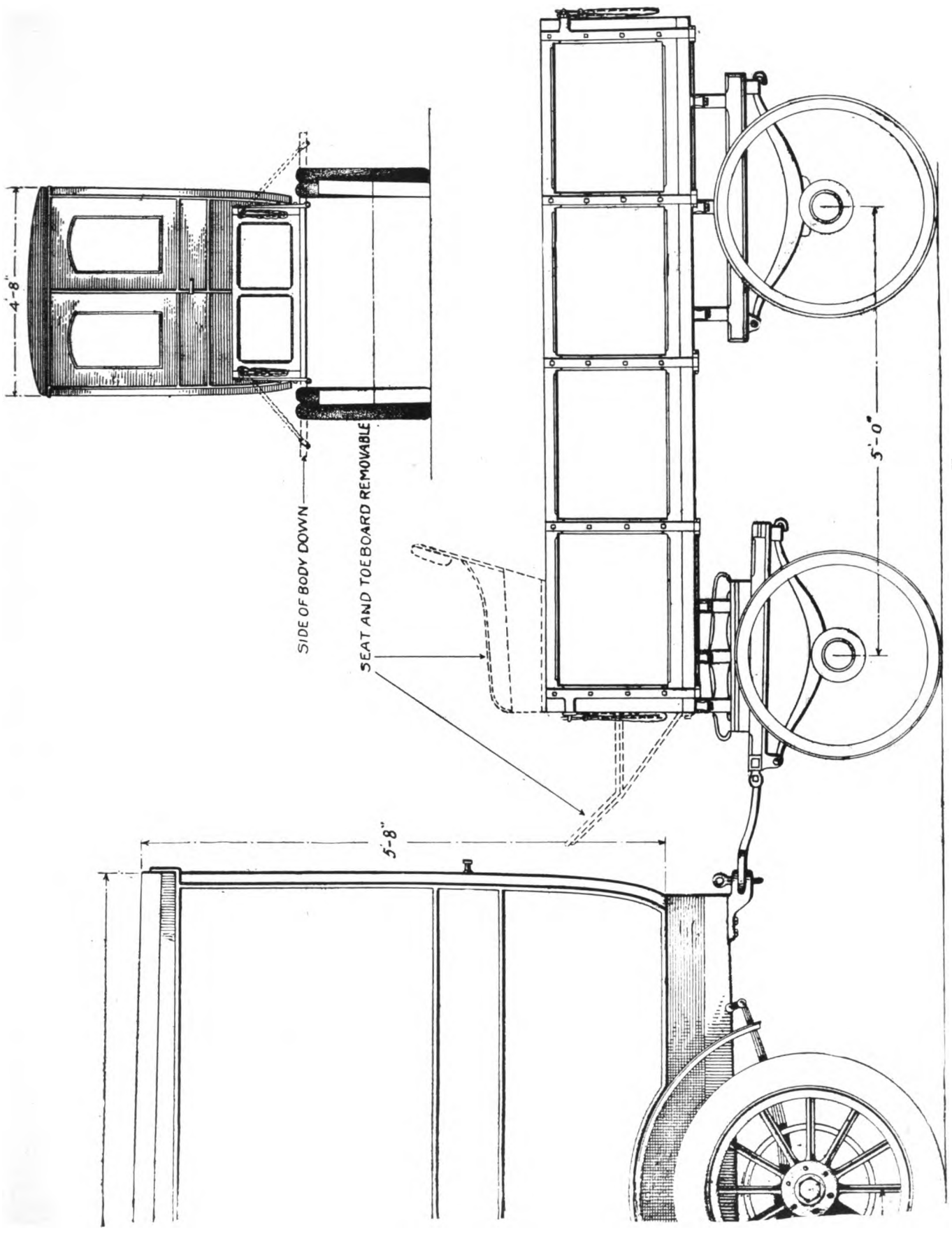
E. L. BARE.

BRITISH AGENCY FOR IMP CYCLECAR

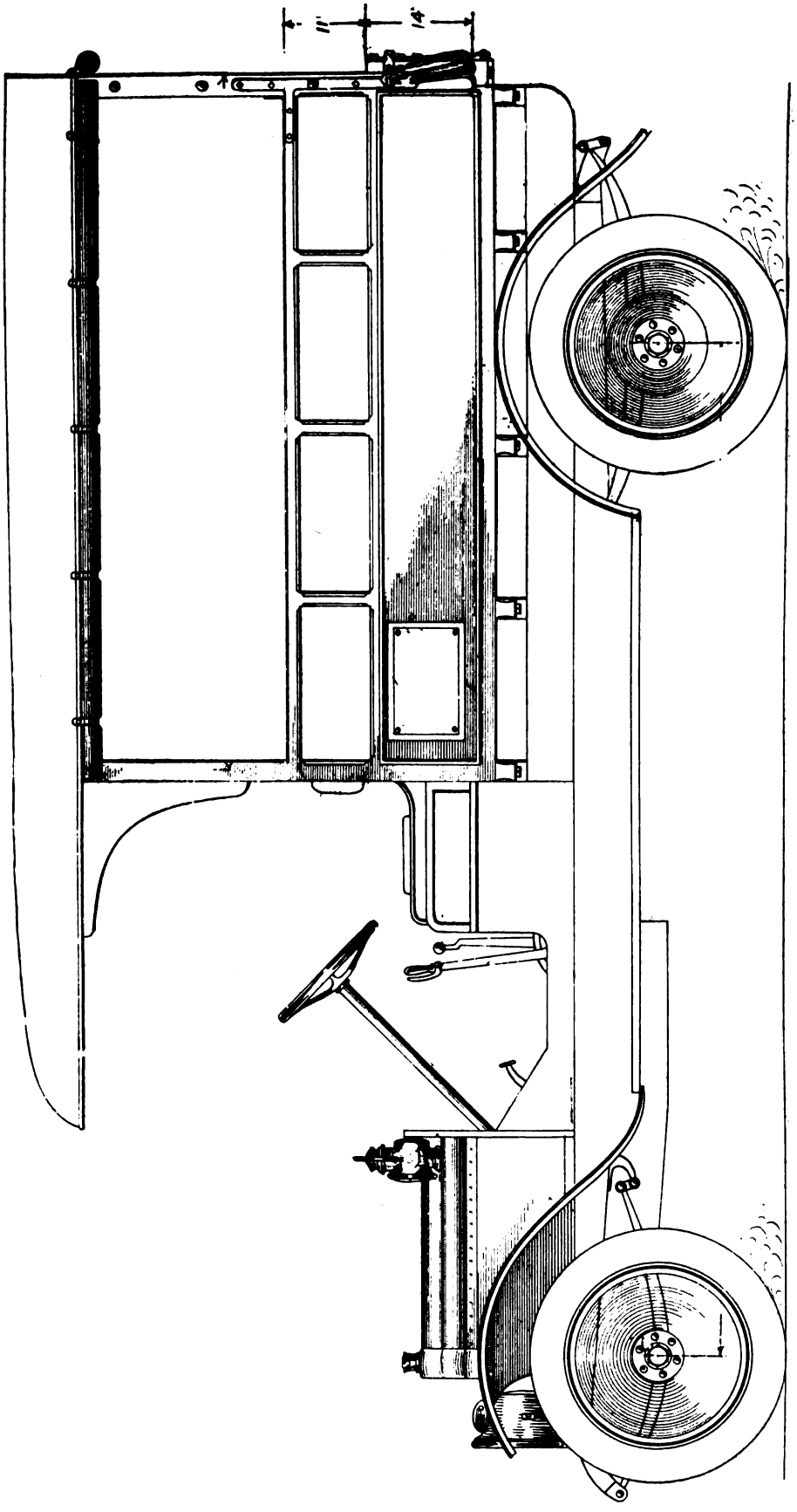
H. G. & F. G. Sharpe, Carrolton House, London, Eng., have taken the British agency for the Imp cyclecar. The life of the contract is for 10 years and it calls for 1,000 Imps a year.



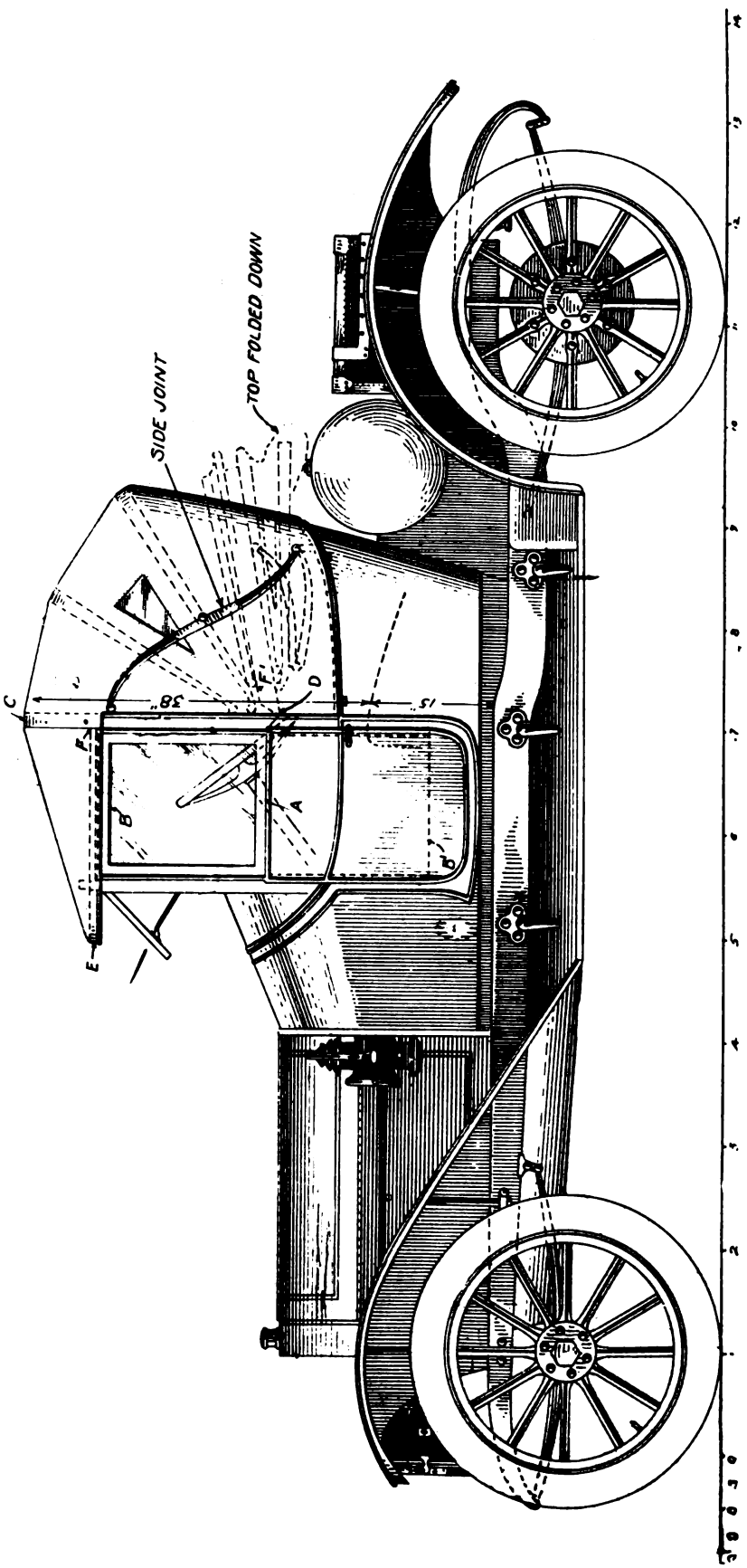
WORKING DRAFT OF AN EXTRA WIDTH BUGGY
(See Description)



MOTOR TRUCK WITH TRAILER
(See Description)



A TYPE OF COMMERCIAL BODY INEXPENSIVE TO BUILD
(See Description)



AN ALL-SEASON RUNABOUT
(See Description)

DESCRIPTION OF AUTO WORKING DRAWINGS

The design No. 1 shows the tendency for trailer service with all kinds of automobiles.. The design illustrated is intended for use on a country estate, and it is made so that this trailer can be used with horsepower as well as with the automobile; and with the particular case in hand the intention of the prospective owner was to have the trailer used to carry general merchandise and coal, and the height was made so that it could be run in the basement of the house by hand power, and for loading or unloading the sides and rear are made to turn down to facilitate handling the load direct into the cellars or bins.

The trailer is an allround vehicle that is bound to become more in general use with the advent of the automobile. There is always power to spare and there is economy in utilizing this excess power to draw a trailer that does not tax the automobile, because the load is not direct on the automobile frame or springs, and the tow is the ideal way of compelling the powerful automobile to work to the maximum without destroying its adaptability for the original purpose for which it was designed.

The size of the trailer will depend on the use to which it will be put as well as the conditions of the roads over which it will be used; if the latter are soft it will be advisable to have the tires, which are always of steel, wider than usual, otherwise the design is exactly the same as used for horse wagon construction.

Fig. 2 shows a design of commercial body, having the essential dimensions clearly indicated. It is a type that is not expensive to build, the framing is extra heavy and all of wood and the top is the customary bow top with curtains. The chassis is the 1,500 pound type, suitable for use for light freight, trucking or general utility wagon about an estate.

Fig. 3 shows how an ordinary runabout can be made to do service in the cold weather as an all-seasons car. More and more the business man is getting to make use of the same body design for all-the-year-work. Business conditions do not permit of having two bodies, one for summer and one for the colder weather, and one body has to do. In the extreme season some provision should be made to protect the driver, and the design illustrated shows one way of accomplishing this result.

The regular body is equipped with a bow top and the door is added too, in order to build up to the reiquisite height. This upper door section does not necessarily have to be a part of the lower door, but can open in two, in a similar manner to the dutch door used a few seasons ago.

This design is practical and has been made as illustrated, and the body design is a stock car that is popular in all parts of the country.

THE DIPLOMATIC DEALER ATTITUDE

It is clear that the customer cannot be always right, but it is clear also that the duty of the salesman toward the dealer must be that he is assumed to be right, and presumed to be making only a reasonable and fair and proper demand. The skill of a salesman in digesting the principles of the factory he represents and adroitly presenting them so as not to offend and to gain the confidence and good will of the customer is the all important thing.

The good will of the patrons of a factory is the thing of chiefest value to it in the lapse of time to maintain its industrial welfare in the struggle for business success. I assume that the good will of a dealer cannot be purchased. He cannot sell his good will. It will not stay bought. If a factory does not deserve good will by reason of the quality of its buggies, by the methods under which they are sold, that good will upon which the company's success depends will slip through its fingers. If we know and can prove that we are right, fair equitable and sound in our principles, the dealer's good will will attach involuntarily. It will be long by right of having won it fairly by right of deserving it. Is there any other possible solution?

The foregoing is the deliberate conclusion of a man who has spent a life time in the building up of a business upon the idea of service.

DOES IT COST TOO MUCH TO MARKET BUGGIES?

Service is being overdone, which means abnormal expense.

A few makers are trying to put on the brakes.

The popular idea has been, "to the Dickens with expense if we can get the business." This worked as long as the expense could be passed along to the consumer.

In the meantime enterprises operated economically have sprung up and their competition has had an effect on trade.

There is a chance to force the dealer to carry his expense of service, while he is left to reckon with the consumer.

Manufacturers of non-competitive lines could organize and have fewer salesmen, as one feature, and reduce the selling percentage.

Let us see if this move for economy will succeed. It might lower the price the dealer is now paying for his goods.

BOOMING VEHICLES IN IOWA

Frank Armstrong, who does the managing as well as the "accelerating" for the Capital City Carriage Co., in Des Moines, Ia., has been making good copy for the local paper. Here are some of the good things he has to say for the horsed vehicle:

An investigation conducted among Iowa dealers indicates that a revival is setting in and the coming season will be the best for a number of years in the buggy trade.

When the automobile business took its sudden rise a good many dealers became discouraged and thought the doom of the buggy trade had been sounded. The best available statistics appear to indicate, however, that there are still running in Iowa at least ten buggies to one automobile. This condition is bound to continue until the roads are tremendously improved over their present indication.

Many dealers report that their buggy sales are increasing and in a good many localities they state that the automobile business has not affected them at all during the past year. With the excellent crop outlook and the prospective boom in industrial conditions, it will be only natural that sales in the vehicle trade will increase as well as in other lines.

Everybody rides in Iowa. It is simply a choice of methods, which depends in great measure upon the degree of comfort that may be secured within the limit of the pocketbook.

"GET A HORSE!"

This is an account of the trials of the motor fire apparatus when it has to buck the snow. In many instances animal power rises superior to motor power.

The interest in this affair, according to the local reporter, was chiefly in the stalling of the fire apparatus, no piece of which was able to get within 100 yards of the scene. The crowds which lined the sidewalk were loud in their adverse criticism of the department. Nothing seemed too bad to say. "Get a horse," was the most general comment to be heard, while all kinds of abuse for the department was in order.

In order to get out the apparatus after it became lodged in the snow, carpets and coats of the men were resorted to and served to give the wheels some grip with which the motors could be easily backed out. The wheels were then wound with heavy rope which served much better than the chains and enabled the machines to get back to the stations without difficulty.

THE CYCLECAR, WHAT ABOUT IT?

Its Development Sketched; Its Place in the Vehicle Family; Its Possible Future and Influence on Established Types of Vehicles—Naming Those Now in the Field—Points for the Consideration of the Horsed Vehicle Builders—What of the Future?

There is no type of vehicle that so fills the builder's eye so completely as the latest arrival, the cyclecar.

For some time the European field, especially the English and French segments of it, has been well sown with cyclecar seed. The developments have taken on many phases of the movement. The types have not been constant. In fact the industry is only in its formative period, but already the idea has jumped across the ocean and has fired the fancy of builders and engineers in this country.

What the outcome will be it is hard to say, but the possibilities are tremendous. If this type should catch on the growth of the formal type of motor car will seem slow and confined compared with the growth of the cyclecar, is the opinion of many observers.

At any rate, if this type of vehicle should arrive, it will be something the horsed vehicle builder will have to consider seriously, therefore, it is very desirable that the progress of the movement should be noted and considered. We have tried to perform this duty to readers in what follows.

A year ago there were no cyclecars in this country. Today there is a growing movement. Besides those on wheels and for sale there are upwards of 100 cars of different makes in process of making for the market.

Already there is a National Cyclecar Association. Its first president, Mr. McIntyre, is an ex-carriage builder, ex-president of the C. B. N. A., and a man who is quick to see and act on new developments.

There are nearly 85 outfits that have announced their plans for making a large quantity. As yet, the Imp car is the first in the agents' field as a salable commodity, but several demonstration cars are in hand, and many factories are working solely on demonstration cars.

A clash of type has already been noted and named as the cyclecar and the light car. The cyclecar strives for simplicity all along the line, and cost down, down, down. Such a type is the real thing.

The light car aims at copying a motor car on a diminutive scale, thus getting at low cost and cheap price.

But the cyclecar itself, true type, is differentiating into two divisions, the passengers in tandem seats, or the passengers seated abreast. We will point out the differences. Both types have made good as practical vehicles, and have met road conditions with great success, as well as piling up speed in a way that offers competition to most of the large cars. They have also shown capacity for going through road conditions that absolutely stall and finally stop the larger cars.

These tests have proven that it is possible to make a cyclecar of as great comfort as a "touring car," and equal roadability. These cars are wonderfully reliable through the simplicity of their mechanism, and they can be run for one-half to one-fourth of the upkeep of the cheapest light cars now sold.

Tandem Seating

Of 36 styles which have been announced and which will be on the market soon, 18 are tandem, eight side-by-side and three of the staggered type. There are seven light cars announced as well which are built to ordinary motor car specifications.

The tandem cars, with the exception of the two, have adopted 36 in. tread as standard and have found in every case a surprising comfort, roadability equal to standard tread and an ability to make speed with small motor power.

Four side-by-side seating cars, the Falcon, Dudley, Signet and Dayton, have succeeded in building these wider bodied cars on the 36 in. tread and are obtaining surprising results. Other side-by-side cars vary in tread from this to 55 inches, having no definite standard, but aiming at the tread that fits their proposition best.

The light cars are all of wider tread than the tandems, but are often heavier mounts with more powerful and complicated machinery.

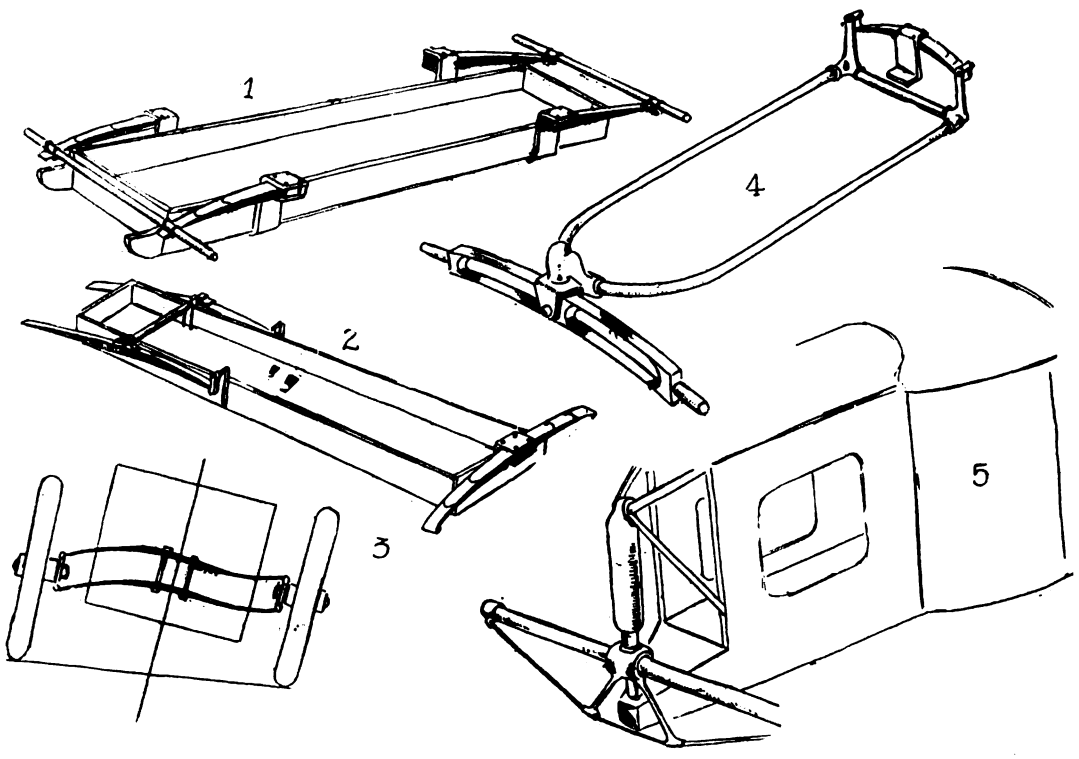
Probably the most important item in the building of a cyclecar is the springing. The motor may be capable of driving the car at 50 miles per hour, but if the driver cannot stay in the seat or enjoy comfort at over 20 this will be his speed. The greatest item in getting comfort is first to eliminate all the weight possible under the springs, then to fit the most resilient type of springs with the least reactive tendencies. In this must be considered minimum cost, which is after all the whole reason for the cyclecar movement.

Type of Springs, So Far

The type of springing most popular is the quarter-elliptic system, Fig. 1. In this construction the springs are made straight and long, as a cyclecar must go over the same roads at the same or better speeds as the big car. They are made wide enough to eliminate any tendency to sidesway when set up at angles. The big ends of the springs are generally bolted to steel castings bolted in turn to the main frame. Early cars had these too light and bent either the castings or the frame. This bending tendency is the chief fault of the long quarter-elliptic type but if this is taken care of it makes a good spring from every standpoint.

This spring is used by the Dayton, Rocket, Mercury and others.

Next in popularity is the cross spring in front fitted to the axle by links, and side springs at the rear (Fig. 2). These may be quarter-elliptic as on the Comet and Dudly or of the cantilever type as on the Robey and Steco, these, however, having a double cross spring construction in front. This arrangement gives a three-point suspension effect which saves strain on the frame and mechanism and is very simple, while the long springs at the rear give great comfort. While the cantilever type of spring has many advantages it is more expensive to fit than the quarter-elliptic.



SPRING SUSPENSIONS

The third type differs from anything in use in car practice. This plan substitutes cross springs where the axles are usually found (Fig. 3). The action is shown when the body has a jolt, and also shows one of the great advantages of the idea. The radius rod action of each spring half keeps the wheels parallel to the body. It is almost impossible to make the car roll or lean when moving, due to a sort of gyroscopic action being set up.

This takes out cost of axles, too, and leaves a chance to fit more auxiliary springs than can be done in other types. This body doesn't roll unduly in turning corners, if springs happen to be too easy. This style is found on Imp, Steco and Robey, so far.

Fig. 4 gives a view of a double pivoting front axle idea used on Falcon, that makes use of the spring for axle idea in a novel way. Study its play.

French Bedelia the Type Car

Bedelia, the car that evoked the idea, is of French origin and make, and in Fig. 5 it is shown how the front axle and spring system has been worked out. Some Americans have followed suit. Economy is one of them. The entire front axle pivots for steering like a vehicle fifth wheel, and is supported by a coil spring inclosed in the upright tube shown. Top end of spring tube is fastened to the frame as shown. This construction has been very successful, and can be made at low cost.

Transmissions Interesting, Also

The first example, T1, is the friction belt transmission used by many. In this case the disc is fitted directly on the motor, supported by thrust bearing. The plan makes use of a jack shaft with a friction spur wheel faced with fiber, that presses against it suitably. At ends of shaft is a pulley for belt drive (V style) to rear wheels. This allows for a compact power unit, and the use of long belts, that are claimed to have the most pull.

Fig. 2T shows somewhat the same idea, but with friction device under seat. This plan shortens the belt, and allows the operation of a front door. The little cut, 1T, is yet another plan where the friction is placed at the rear of the back seat, connected by short chain to a rear axle without differential. This is the way the Twombly and the Robey are hooked up.

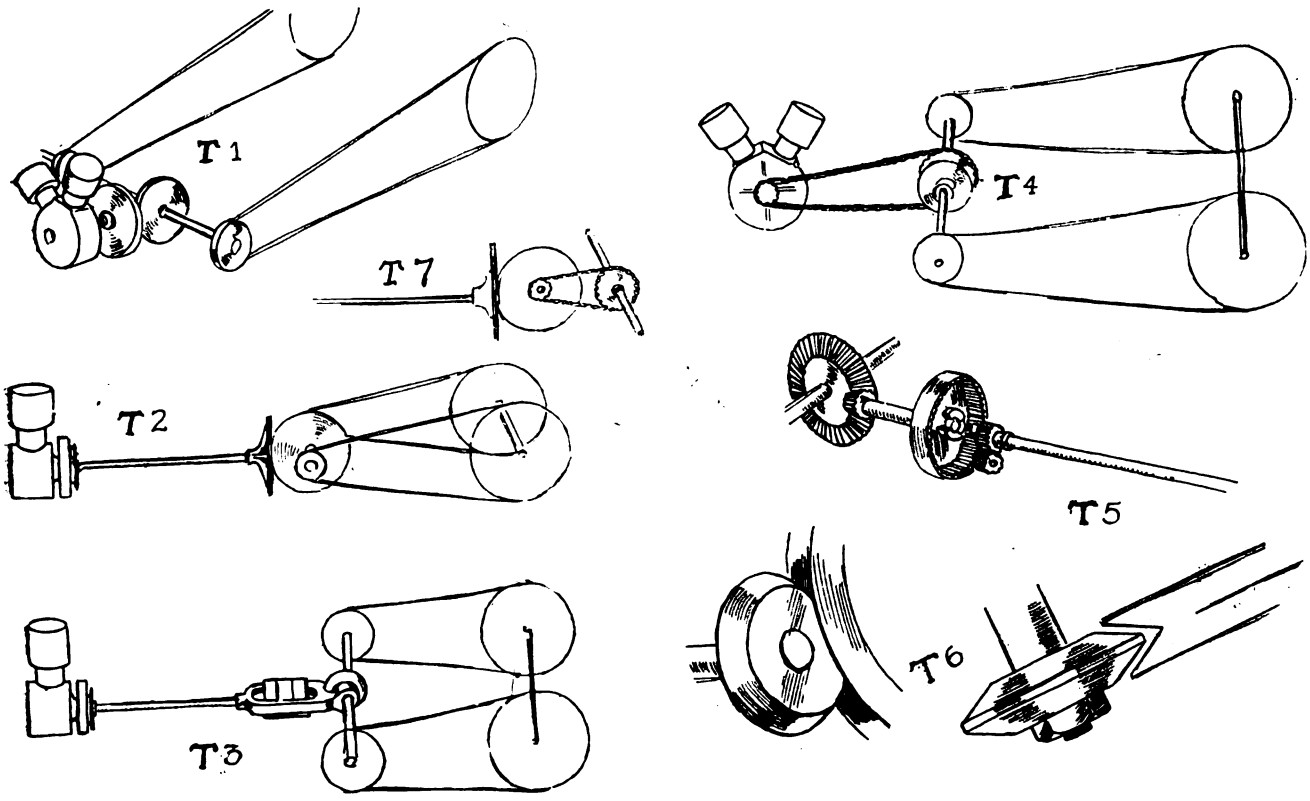
Some cars have two-speed planetary gear sets in connection with belt drive, see Fig. T3. The Rocket is a car so arranged. A long shaft connects to the planetary gearset under front seat and bevel gearing transmits from this to jack shaft on which are fitted adjustable belt pulleys. Some use the construction as shown by T4, belts running from jack shafts to rear wheels, in usual way.

Something Still Different

Something quite clever and new is a two-speed-and-reverse gearset having but three gears. This is a feature of the Cornelian and shown at T5. The motor shaft runs back to rear of car, terminating in a small pinion meshing, with a second of same size. Rear axle supports a drum with internal gearing, and in center a dog clutch. A disc clutch is fitted to motor shaft, also a sliding joint and universal. On main shaft pinion are the other jaws of the dental clutch, and when engaged, car is on high. When main shaft is raised to bring the pinion in mesh with internal gear, car is on low. When in contact with second pinion car is on reverse. This simple arrangement is worked by one pedal, which works clutch and shifts gears automatically.

Another system is used by Duryea in a light car which he calls the Duryea roller drive. This system, instead of using belts to transmit the power, a pulley is made having a V-shaped edge to fit a groove as shown at T6. This pulley jams into the V of the rear pulley in a way which gives efficent traction in a form of transmission not affected by mud or wet. This drive is entirely free from belts, chains and shafts, being pulley against pulley as used for years by Duryea.

It is very probable that the eventual cyclecar transmission system has not yet been suggested as new mechanisms may be devised to fit new conditions, but those shown have demonstrated possibilities, and have shown themselves capable of meeting the conditions imposed upon them by the heaviest road work in these light cars. Where friction drive is correctly installed so that all parts are rigid and do not spring under the thrust of disc against wheel, this transmission has proven efficient and reliable.



TRANSMISSIONS

Belt drive when fitted to large pulleys with flanges extending out beyond the greatest belt diameter has proven capable in all sorts of road and weather conditions and shows only the disadvantage of the impossibility of fitting doors to the car and of the cleaning required from time to time to keep the belt surfaces in shape.

The planetary transmission, outside of its higher first cost has shown very good results for running where only two speeds are required to handle the road conditions. The future of the more revolutionary types shown in 5 and 6 will be watched with interest.

As to the Steering

The steering of the cyclecar is an easy matter as the vehicles are so light and mount obstructions so easily. The arrangement of steering devices is hardly the same in any two cars. The first steering arrangement tried was the drum-and-cable arrangement. In this form the steering pillar carries a spool, or bobbin, at its lower end around which is wrapped a steel cable. This cable passes on to the ends of the steering arms where the ends are fastended. A cross rod connects the steering arms so that they always move in unison. By turning the spool or bobbin by means of the steering wheel the cable is wound up on one side and unwound on the other, thus steering the car.

The Mercury is using a modification of this, but using a rack and pinion instead of the bobbin, and chains in place of cable. These chains run from fastenings at the end of the rack and around pulleys to the steering arms, a forward arm having the cross rod connect the steering arms, holding wheels in line.

In using cross springs for the front axle the Imp has a somewhat complicated rack device mounted on main frame of cars and having a down extending arm from which a rod extends to a central triangular lever pivoted at its wide ends to the front of the car frame and having a rod from either side extending to the steering arms. By this means the movement of the body up and down is thrown to the side arms equally, and on the same radius as the cross springs.

Seatings Differ

The seating arrangements vary. Most of the cars seat tandem to obtain less wind resistance and better springing. There are several arrangements of tandem seating, and the nearer the seats can be brought together without crowding the knees the more sociable is the car. The Imp arranges the front seat in the center of the car, Fig. S1, so that the feet of the rear rider are on either side of the front seat. This shortens the wheel base and allows the seats to be very low.

At S2 is shown a side view of another seating scheme where the seats are higher and the feet of the rear rider are under the front seat. In some cases, however, the friction transmission is under this seat so that the wheel base has to allow of a footboard behind the front seat.

At S3 is shown the hammock type of seat which is comfortable when rightly made and mounted. It consists of heavy canvas or imitation leather stretched loosely between two cross supports.

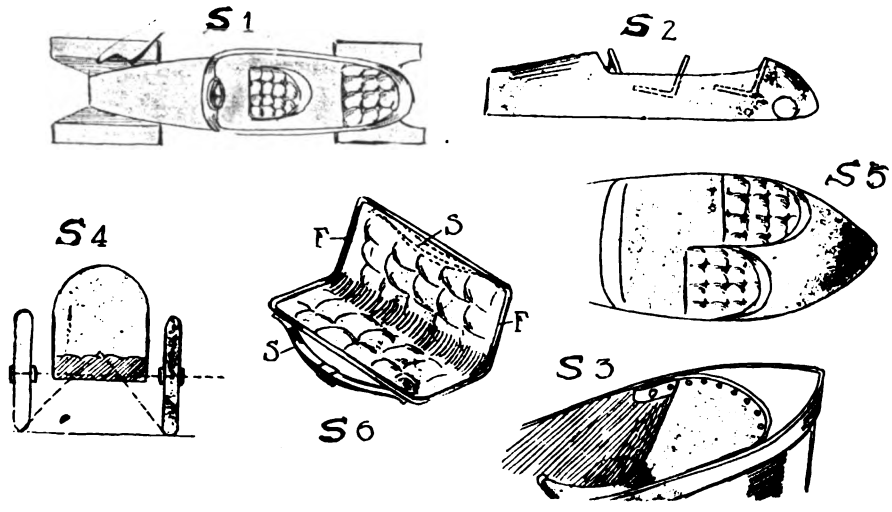
The advantage of seating low is shown in S3 for it will be seen that with the seat in the position shown there will be a minimum of side throw when the car sways in rough places.

To get side-by-side seating with minimum width a few cars are fitting staggered or semi-tandem seats as at S5. In this case the driver's seat is 8 or 10 inches in front of the passenger, this allowing plenty of shoulder room and hip room in a narrow body width. By adopting this side-by-side seating on the 36-inch tread, a tread usually limited to tandem cars, is easy.

The narrow tread is claimed to take much less power to drive than the standard and this is illustrated in Fig. 4 where one sketch shows a wide tread and another a narrow tread wheel diagram. The drawings, Fig. 4, show the car at the time when a front wheel hits an obstruction, the line of thrust against bump being from the center of gravity CG to the point of

contact of obstruction with wheel. This line resolved into thrust components shows that the relation of forward thrust on the wheel and car is as F to S.

With the narrow tread car the same conditions are taken and on resolving in the same way the proportionate relations are as F to S again, this time with the greater part of the power thrusting forward and a small percentage used in side



Seating Arrangements

thrust. This is the argument of the narrow-tread advocates, and is given as the reason for the surprising speed which these cars obtain with such small motors.

Fig. 6 shows the theory of the narrow tread on the road, its ability to get between the ruts, to fit between the rut and horse track, and to pick a path in otherwise bad places.

Expert Opinion

Of course opinion is split into as many pieces as there are special and selfish interests as to the promise of the cyclecar. In the case of a new evolution this is always so. The conservative is the fellow who has already "arrived," and doesn't want to be disturbed, the radical and innovator is the fellow who has his to get. The "expert" is the man who has no axe to grind, presumably, so can look over a situation calmly. We will quote bits of the outgivings of one of them which we find in the Automobile. The illustrations in this article, and some of the statements are from the same source.

A large amount of the criticism of the cyclecar has been based on ignorance of its capabilities and its definition. It is very easy to understand what a cyclecar is, if the spirit of the movement, rather than the cars which are now offered as cyclecars, is taken as the basis.

In the discussion of cyclecars the truest word was spoken by R. M. Lloyd in a single sentence which was all but ignored: "As I understand it the people want something that they can run at a lower cost." The people are used to motor transportation, they are used to riding in motor cars, they know internal combustion motors and demand a new vehicle which they themselves can afford to own. This vehicle of minimums is a cyclecar.

Formerly Europe has taken the lead, and America has followed. Within two years American-made cyclecars will be invading England and Europe.

In producing these cars, no one has been more surprised at their action and comfort than the designers. To produce a car that will do the work well precedent will have to be thrown aside. Given the result for the price, sales will follow faster than production is possible.

The general outline of what a real cyclecar will finally be is easy to discover if the low cost is kept in mind. These are the methods to obtain the low cost.

Under gasoline economy are light weight, small motor, narrow tread, small wind resistance.

Under low upkeep are minimum unsprung weight, minimum parts, weight, proper springing, easy home repairs.

Under tire economy are light weight, correct suspension, balance, flexible transmission.

Under depreciation economy are best material, workmanship, springing, narrow tread.

All of these features are bound up in each other.

The Idea in Unsprung Weight

This is not widely understood by builders. Many makers, even, could not explain why, despite rough surfaces, they were not thrown from seats.

Suppose we have a weight of 100 pounds, a spring beneath, and below that a weight of ten pounds. Strike the lower weight a blow upwards, depressing the spring an inch, and then released. The rebound of the ten pound weight will send the 100 pound weight up 1/10 inch. The reaction distance is in proportion to the mass. Increase the weight above the spring to twice the amount and you halve the jolt from the one-inch jar below. Change the weights any way you like, keeping the proportions, and the results will be uniform.

With the little car, the wheels, tires and axles weigh about 60 pounds, body about 100, passengers (tandem) bring total weight about 325 pounds on the springs. This makes the weight relation less than 1 to 5. It is 1 to 3 in a big car. The

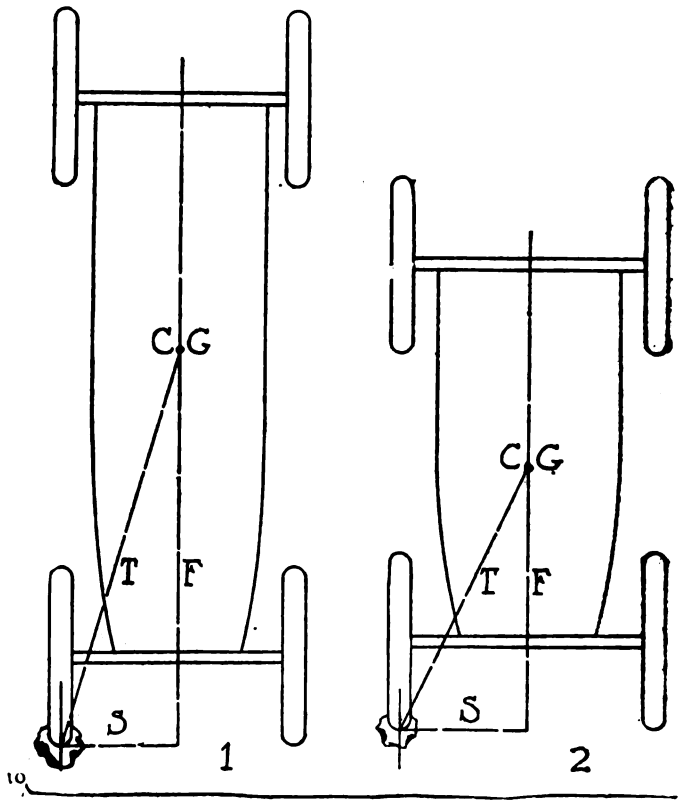


Fig 4. Narrow and Wide Tread Construction

cyclecar thus has less than half the tendency to throw the passengers out. It so works out on the road. The cyclecar runs in rougher places, between ruts, with no discomfort, and

no throwing side to side, as in big cars. This is due to narrow tread and low center of gravity.

The item of springing (suspension) is next in importance to that of weight ratio. Small cars meet the same sized bumps as big cars, so must have as much spring action. This action should be 4 or 5 inches. Tandem seating allows of the most sensitive springing, as all the weight is in line, whether one or two ride. Since the cars run sometimes tipped at big angles, sidesway must be looked out for, so full elliptics are at a disadvantage. So far, long cantilever springs give best results, it is said, and they are cheap to fit.

The small cars negotiate all kinds and conditions of roads, and leave big cars behinds when the rough spots appear. This knocks out the idea they will not do on country roads.

V-Tvpe Motor Simplest and Cheapest

The simplest, cheapest motor adaptable, of the required power and low weight, is perhaps the V-type. This does not mean

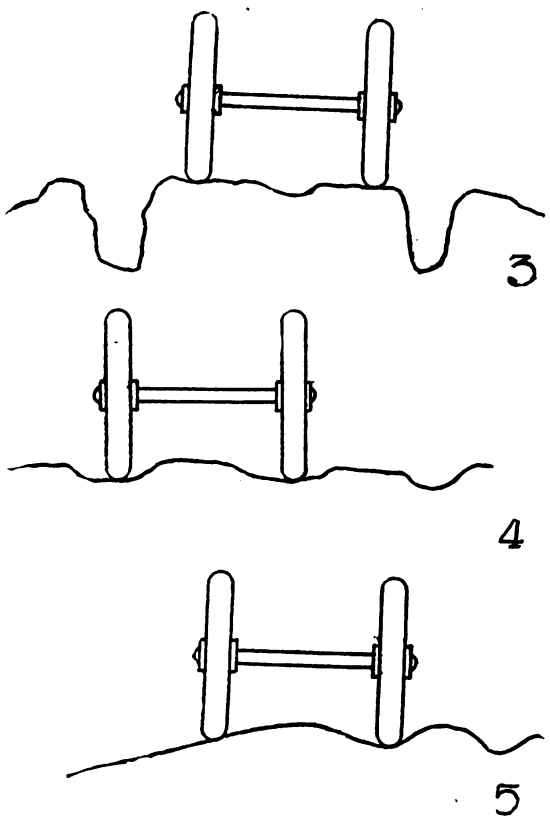


Fig. 6. Adaptability of Track to Road

that it will be of the motorcycle type, although it will probably be of motorcycle arrangement. The inside flywheel assembly can be reduced in cost; half the motor can be cast in a unit; the manufacturing cost can be reduced in many items. The oiling must be better taken care of than in motorcycles and an oil sump added, perhaps. The carbureter must be improved to get easy starting. Present motorcycle magnetos will not do for cyclecar motors and dual systems are too expensive. Battery ignition fed from a storage battery, which also feeds the headlights, is fast being adopted, the battery being charged by a small generator. Thus for about the price of a magneto the cyclecar gets proper ignition and electric lighting combined. The starting of these motors is a problem; one cannot spin a V-motor by hand, for the crank runs from the ratchet when the compression point is passed. A quick turn must be made to start the motor; hence a battery spark is necessary.

The eventual cyclecar motor will have many less parts than the motorcycle motor. It will have 70 cubic inches displacement. The typical cyclecar will be cooled by some air system; the heavier and more expensive ones by water. Four-cylinder motors are almost out of the question, on account of cost and the unreliability of small piston rings. What may be developed in the future, however, in this line cannot be foretold. The simplest, cheapest motor which will do the work reliably will be the one most popular. There may possibly be a revival of two-cycle practice.

For the transmission nothing is more adaptable to cyclecar use than friction drive. In small sizes where twisting of the frame is not excessive, and where the plate and wheel can be large for the power and travel at high speed, friction drive is surprisingly efficient. No one will deny that it is cheap. It gives an infinite variation of speed ratio—an advantage for an air-cooled motor, and is easy to repair and keep in shape. Other mechanisms will be used, but nothing does the work so well for so little money. Fitted with a flexible drive, and to a high-speed motor, it makes a reliable long-lived, cheap-upkeep change gear. The reliability of friction drive cannot be questioned, after its work in the last Glidden tour on a light car, and the fact that the only perfect scores in the hardest British and Scottish cyclecar trials were won by friction-driven cars.

About 90 per cent. of the announced cyclecars in America are friction driven. The mechanism is light, and has nothing in its operation to confuse new motorists. It is as near foolproof as any change-speed mechanism. The sales side of friction drive may be ignored in the cyclecar when the real reason for the cyclecar is remembered. Friction transmission is the cheapest mechanism that will do the work. If there is any more reliable device at the same price, it too will be adopted for cyclecars.

The cyclecar belt problem is vastly different from the motorcycle belt situation. The motorcycle manufacturers discontinued the belt because the motors became too powerful for the belts when the belt centers were short, and the belt size limited. To try to transmit 10 horsepower through a 1⅛ inch belt over 5 inch pulleys and short centers, is contrary to all belt practice and knowledge. To work efficiently belts must run between long centers, over large pulleys and have ample section for the load. With cyclecars two belts of the same size as used on motorcycles, and generally much longer as well, are used. These pull very reliably, their chief disadvantages being the care needed to keep them in shape, and the dirt they pick up.

The differential action of a belt drive is seemingly misunderstood. The statement has been made that if the belts are loose enough to give differential action, they are not tight enough for driving. Cyclecar belts do not run as tight as motorcycle belts and get their differential action without slipping. The outer belt mounts in the pulley to a bigger diameter and pulls evenly. Those who find otherwise in theory are forced to admit a perfect differential action when they actually see the drive in practice. However, with the 36-inch tread a differential is unnecessary in any case, for there is more comfort and no extra tire wear with chain drive if the rear axle is solid. When one wheel leaves the ground the other pushes, and without differential there is no rolling of the car at speeds, as is the case with differential fitted cars.

Betls will survive until other mechanisms which are as cheap and give no more axle weight can be devised. Shaft and bevel drive for cyclecars is at a very great disadvantage, not only on account of rougher riding from axle weight but on account of the height of weight center necessary. Worm drive is not favored for the same reason, although it can be built lower; its chief disadvantage is higher cost—the most important of all.

Single chain drive to a rigid axle will probably be seen in quantity.

Now About the Seating

The seating arrangement is worth more than the mere mention which has been given it. Many think that nothing but side-by-side seating will do. It is probable that road work

and sales will dictate otherwise. In the first place, the cyclecar is a new vehicle and must look the part. It must have lines and not look square or squatty. It must have speed and roadability. It must have maximum comfort and style. In all of these points the tandem excels, and is a very close second to the side-by-side, public opinion to the contrary, in the matter of sociability. To drive it is a new sensation, which is not the case with side-by-side seating. There is plenty of seat and shoulder room, and above all the best springing possible and the best dust protection. It is not possible to give as ample dust protection with side-by-side car. The cyclecar must have much better dust protection and fender equipment than a big car.

Again the tandem car is safe at steep angles. Both passengers leaning to one side can hold the vehicle steady at a 40-degree angle, while in a side-by-side car the weight can be shifted but little and the lower passenger is at a great disadvantage.

Second to the more comfortable springing of the tandem is the matter of wind resistance. The term "streamline" is much abused. At 20 miles an hour wind resistance is a small matter. At 40 it is worth noticing, at 50 it is an important item, but at 60 it is a real problem. One often drives against a 30-mile wind. This velocity gives a relative wind speed of 60 miles per hour when the car runs at a 30-mile speed. A tandem car can breast this easily, with top and windshield up; a side-by-side car with 10 to 12 square feet of surface to the wind would be using up 10 horsepower against wind alone, and not have any power to spare for speed, if the ordinary cyclecar motor were used. A headwind does not bother a tandem; it is a bugbear to a wider small-engined car. One cannot easily streamline a wide car, while the tandem can be truly streamline.

To Sum Up

There will without doubt be many types of cyclecar. Each will be successful in its own field. The simplest, cheapest construction that will do the work, is the subject of this paper. We are studying for a product of the "minimum" type in everything but performance, remembering at the same time that the simplest mechanisms are the most reliable and cheapest to keep in repair.

Other points might be taken up here; the reason for small-sized tires, on account of the new type of strains set up by the low center of gravity; the easier road repair possibility; quicker get-away and easier braking effect; starters—a mechanical foot starter inside being as cheap as a crank in front and much more handy; luggage spaces; poncho tops; special type hubs—the detachable wheel not being necessary for the simple light car, as tires can be so quickly mended on the wheel—but the main points have been cited. When there is a demand, which there is, and the money to back it, leave to the American engineer meeting the demand successfully.

ORIGIN OF THE HANSOM

Just about a century ago Londoners were beginning to look with a good deal of dissatisfaction upon the lumbering hackney-coach, which for 200 years had been the only vehicle allowed to ply for hire "within the bills of mortality"; and the introduction, in April, 1823, of two-wheeled "cabriolets de place," built after a French pattern, was much appreciated. These vehicles, the name of which soon received the popular abbreviation of "cab," accommodated two passengers, the driver being "relegated to a comical looking seat built on the off side, between the body of the vehicle and the wheel." The fares were protected from the weather by a wooden canopy and apron, while a curtain could be drawn across the front to keep out wind and rain; and their lightness and conveyance were such that they rapidly superseded the hackney-coach in public favor. There was, however, a certain instability about the two-wheeler which called for improvement. Early in the thirties one or two "patent cabs," with bodies much closer to the ground, made their appearance, the driver's seat now being placed upon the top of the vehicle; and finally a form was assumed to which, with hardly adequate reason, the name of one of the inventors of this period has been permanently affixed.

"Hansom's Patent Safety Cab," a somewhat remarkable looking vehicle, was designed by Joseph Aloysius Hansom, a Birmingham architect, about the end of 1834. The principal advantage which could be claimed for it lay in the fact that the doors were in the front, instead of being, as in preceding "safety cabs," at the rear of the vehicle, and so facilitating the too common practice of "bilking," or escaping without paying a fare. A company was formed to acquire Hansom's rights in his patent, but improvements were quickly effected in its essential features, and it was to a Mr. John Chapman that Londoners were really indebted for the introduction of something resembling the modern hansom, with the driver's seat placed at the back, about December, 1836. Since that date, according to a recent writer, "the only important alteration was the introduction of the straight axle, which necessitated the cutting away of the body of the cab beneath the passenger's seat."

The builder of the first London cabs of 1823 was a Mr. David Davies; and by a coincidence, it was an ex-London cabman with a very similar name, who was responsible for the introduction of the hansom to Melbourne, about the middle of 1849.

VEHICLE TRACKS IN WEST INDIAN ISLANDS

Cuba—Cuba has 1,663 miles of cart roads. Native ox carts measure 6 ft. from out to out. Other carts, drawn by mules, measure 5 ft. 6 in. and 5 ft., out to out. All other vehicles imported. The tread is that of the country from which they come.

Haiti—Wagons and carts as made at Port-au-Prince have a gauge of 5 ft. 6 in. to 6 ft., out to out. Native carriages usually measure 5 ft., out to out. No vehicles are made at Cape Haitien. The majority of the carriages in use in the island come from Europe or the United States, and are built in all respects as for the home market of the respective countries of origin.

Jamaica—Throughout the island of Jamaica the standard gauge for road vehicles is 4 ft. 8 in., out to out.

PLENTY ROOM YET

The entire United States, excluding foreign possessions, contains about 1,900,000,000 acres. Of this area 1,140,000,000 acres (60 per cent.) is estimated to be tillable. This includes land already under plow cultivation and that which in the future may be brought under cultivation by clearing, drainage, irrigation, etc.

361,000,000 acres or 19 per cent. are estimated to be nontillable but valuable for pastures or fruits. Only 21 per cent., or 399,000,000 acres, was estimated to be of no use for agriculture present or future.

WIRE WHEELS AND RUST

Now that the wire wheel is whirling, the old question of rust comes up. When the wire wheel was tentatively used on the horse-drawn vehicle, it was the rust problem more than anything that prevented the wheel finding a permanent foothold.

It is suggested that the rims of such wheels be slightly warmed, then painted with aluminum paint—two coats—and then, if rubber washers are placed inside the security bolts and also the valve stems, the water will not get inside and set up rust that rots the canvas. This is the advice of one who has tried it this way.

THE CONSULAR REPORTS ON VEHICLES

As explained on another page, the consular reports on vehicles, that have been gathered through the initiative of this journal, are now on view and ready for inspection in different parts of the country.

Those to be seen in the room of the Department of Commerce at the New York Custom House, cover the European countries, Germany, Russia, Austria, Italy, Greece, Portugal, Belgium, Servia, Turkey, Netherlands, Denmark, Switzerland, Sweden, Norway, England, Scotland, Wales, Ireland, France, Spain, and the Azores.

The reports are very comprehensive, and in some instances are accompanied by trade price lists, or illustrated catalogues, or photographs of a few vehicles.

The European collection is not of any commercial value, because the type of vehicle is of the medium and heavy order, and made in quantity to meet the limited demand by local coach builders of limited capacity and very long establishment in most instances.

The facts gathered are curious, often, and would hold attention for that reason, if for no other. We hope to have the opportunity to disclose them to readers at an opportune time.

The second section now in the west will disclose the state of trade on this continent, and should be very serviceable to those who are seeking opportunities for outlet of product. We hope to make the data available for our readers.

Looking over the European reports we found a few interesting memoranda. For instance, the oldest carriage building business in Brunswick, Germany, was established in 1758 by Paul Kathe "in firma Fr. Muller."

The jobs built in Plauen are quite like our own, and the vehicle tracks are similar.

The chances around the city of Frankfort for vehicular trade are fine (?). For instance, the population is crowded in 365 to the square mile, and in Hesse-Naseau, 430. The farmer has no use for vehicles except for use on the farm, and there is no such vehicle as a buggy on the premises; other types are about like our custom-built work. Along the Rhine, carts and harness are about the same as they were in 1500. Persons of wealth in Frankfort affect the buggy a la Americaine, but as well as the consul can learn the sales are about three a year!

In Baden there is one horse to every 29 inhabitants, while in the United States there is one to every 3.6 of inhabitants. The cow is the "horse" on the farm, and that useful creature is also used there and in Alsace for pleasure driving, also.

We note in the matter of furniture vans that they are built about as large as one of our railroad box cars, with broad tired wheels of very small diameter.

Tracks of farm wagons are 4 ft. 3 in., 4 ft. 8¾ in., 4 ft. 1⅜ in., 4 ft. 4½ in., 4 ft. 3½ in. Commercial trucks run 5, 4, 5.1, 3 ft. 8¼ in., 4 ft. 2 in., 4 ft. 10 in., 3 ft. 11 in., 4 ft. 6 in., 5 ft. 2 in. Vans, 4 ft. 7⅛ in., 4 ft. 9½ in. Landaus, 5 ft. 1 in., 5 ft. 2 in., 4 ft. 11 in.

Collinge patent axles sell for $8.33, when made in Germany. Duty is $2.38 a sett.

Breslau is the one German city that holds its own in the horsed vehicle line. There are about 2,000 carriages built yearly in Silesia—but they are all home made by little builders, mostly, who turn out a few a year.

Russian peasants use sleighs for which they pay $6 and $8 apiece. They are for farm use. In southern Russia the roads are wide enough for teams in vehicles built after German types. But carts are drawn by oxen, and in southeastern part camels are used.

The Lineika is a 6-8 passenger vehicle where they sit back to back and help brace each other from the jolts of the horrible roads.

Where no railways are available the Postal authorities transport the passengers, using omnibus or two-passenger jobs, as warranted.

Brakes not used on Russian vehicles, except in Caucasus and Crimea. American varnish is used almost exclusively by best builders.

In the Caucasus vehicle (Arba) are 2½ yards long, 1½ yards wide, bottom of boards, sides wicker or basketwork construction, and low wheels.

In trans-Caucasus the carts are about square in dimensions, high sides, and wood pillars used as supports. The wheels are 5 ft. in diameter, and the rim reaches to top of cart. One horse does the work.

The chief carriage works in Odessa builds but 80 jobs per year. All fine work was imported from France 35 years ago, but 20 years ago such importations ceased owing to the skill of the Russian mechanics proving equal to the situation.

In Riga a vehicle is built co-operatively, so to speak. The smith passes it to the wheelwright, and the saddler finally gets it to trim and to do the selling.

In Finland the "Kustarm Industry" method applies equally to vehicles. Peasants living in the woods select the lumber, metal parts produced at factories that do that alone, and so on, all being done by hand. In Kustarm schools the pupils are instructed in building vehicles. There is a special vehicle school in Province of Vasa. The peasant cart is made entirely of wood, and with primitive tools, but the job is strong and durable.

The kurikka in Vasa is the uniform style and type of vehicle universally made. The sales are managed by a credit company, which has all to say as to control, quality, material of which built, workmanship, and advertising. It also makes loans to workmen, that they may procure better tools. Price for common sledge is from 6-12 marks, that is, $1.17 to $2.35. A passenger sleigh costs from $5 to $30.

These are some of the curiosities of the reports of the consuls.

YOU AUTO READ THESE FACTS

The Philadelphia Record has been among the merchants in Pihladelphia seeking facts as to the supremacy of the horse over the auto truck. We cull just a few of them for consideration:

A few of the patrons have volunteered the following relative to the efficiency of horse-drawn vehicles in comparison with the auto truck.

Newton Coal Co.—Use 835 horses, two trucks. Horses very satisfactory; sorry we can't say the same of the trucks.

Kolb Baking Co.—Work 400 horses, six autos. No trouble at all with the horses, and you can't make that assertion too strong; all sorts of trouble with the autos; bought more horses today.

Freihofer Baking Co.—284 horses, 20 autos. Every horse working except three; most of the autos out of repair.

Gimbel Bros.—276 horses at work, 11 automobiles. Haven't had an unsuccessful trip with the horses during the storm, nor a successful one with the autos.

United States Express Co.—259 horses; no trucks. And best of all, not going to have any; have profited by the experience others are having with their trucks.

Strawbridge & Clothier—198 horses, 30 trucks. Have not had a trip delayed with the horses; not an accident; trucks not dependable; lots of trouble with them; many of them had to be abandoned on the roads all night.

N. Snellenburg & Co.—128 horses at work; 15 trucks. All horse delivery made satisfactorily. Many of the trucks had to be unloaded and towed home.

National Biscuit Co.—93 horses, no trucks. Horses so satisfactory no danger of us substituting them.

D. B. Martin & Co.—112 horses, 12 trucks. The trucks absolutely worthless during the snowstorm; horses working every day.

S. & S. Beef Co.—28 horses; all at work. Had three trucks

but found them so undependable and so thoroughly misrepresented, returned them.

Acme Tea Co.—88 horses, 16 mules, 10 trucks. Horses and mules going at it every day. Ofttimes compelled to send out for the trucks.

Jno. J. Eeelin & Co.—97 horses, one truck. Horses out every day; truck in the shop every other day; cost as much as eight horses.

Finley Acker Co.—33 horses, three trucks. Horse service very satisfactory; one truck in the shop, one truck returned (undependable), the other truck Saturday got out as far as Jenkintown, gave out; were compelled to hire horse and sleigh and deliver goods that way.

Peter Cavanaugh—80 horses, one truck. Horses can make delivery anywhere; truck a source of trouble and expense since I purchased it. Would that it would only jump overboard or burn up without doing any other damage. No more trucks for me, but resolve to stick to horses, as I can always use them to great advantage.

Alsover's Express Co.—We are working 20 horses. Have no trouble with them. Had six auto trucks. Done away with five of them. Lost $13,000 in seven months experimenting with auto trucks. Horses for us in the future.

People Bros.—Work 300 horses. No automobiles. Horses have always been satisfactory to us; the auto man has never been able to convince us differently.

James Irvin—200 horses all at work during the storm; no auto trucks and what is more won't have any; saw too many good fellows go broke trying to keep them up. You would want to be a millionaire to pay repair bills on them.

S. D. Hall—200 horses at work every day. No trouble whatsoever; wouldn't have an auto truck in my place.

Atlantic Refining Co.—250 horses working; two auto trucks. trucks not doing any good, costs so much more to operate than horses; absolutely worthless in the storm.

Adams Express Co.—The auto delivery is much more expensive than the horse-drawn vehicle; found it necessary to equip all our autos with shovels in order to dig machines out of snow when occasion required.

Showell & Fryer—We are working 65 horses, four auto trucks. Horses doing well, auto trucks all out of commission. Wished that we had never owned one.

A cutomer living at Bryn Mawr, in driving from Philadelphia to Byrn Mawr on Wednesday, discovered 19 auto delivery wagons abandoned along the Montgomery Pike; they bore the name of different Philadelphia merchants. No such conditions as this exists among the horse-drawn vehicles.

Moral—If these keen business men find the horse the most efficient mode of delivery, why not you?

MEETING OF PHILADELPHIA CARRIAGE AND WAGON BUILDERS

The regular monthly meeting of the Carriage and Wagon Builders' Association of Philadelphia, was held at the Hotel Hanover, Friday evening, February 20. The subject for the evening was "Our Methods of Doing Business," which had been continued from the January meeting.

A committee was appointed to arrange for a smoker and entertainment to take place some time during the month of March. The usual dinner was held after the business meeting.

THE ATHLETIC CLUB FIRE

The recent total destruction of the Missouri Athletic Club in St. Louis, with its list of near 40 dead, and a long list of injured was a most lamentable affair.

The escapes were truly thrilling in some instances. The fire was as rapid as destructive, and at the early morning hour when it was discovered, it put all the occupants at a disadvantage.

The club was quite a meeting and resting place for those identified with the vehicle and accessory trades, but fortunately we have no casualties to record in this connection.

The fire was discovered on the dining room floor by the wife of the superintendent of the building, and almost immediately there seemed to be flames issuing from every floor at once. The building was supposed to be fireproof. It was owned and also occupied by the Boatman's Bank, an old St. Louis institution.

CINCINNATI CARRIAGE MAKERS' CLUB DISCUSSES FEDERAL RESERVE ACT

Over 80 per cent. of the members of the Cincinnati Carriage Makers' Association attended the regular monthly meeting and banquet at the Hotel Gibson the evening of February 12.

Following the banquet an instructive talk on the "Federal Reserve Act" was given by Edward A. Seiter, vice-president of the Fifth-Third National Bank, who stated among other things, that Cincinnati was sure to use every effort toward helping the Queen City committee, scheduled to appear in Washington on the 16th.

At the April meeting of the association Robert P. Hargitt will give a talk on his trip through Prussia.

President P. P. Hunter, of the association, stated that business in the carriage making line was never better, and that he looked for a record season this spring.

BUGGY MAKER, FEEL PROUD

This is the final conclusion about your product by the disinterested Britisher:

"Although we at home are wont to poke fun at the spidery construction of the American buggy and the vehicle types closely related to it, yet it is a pattern of horse carriage which has successfully withstood the onslaught of the motor car, more so than the British types of light two and four wheelers. It is a pattern which not only finds favor throughout North and South America, but it is found in our own colonies and dependencies and in many other foreign parts. We at home seem to have a love for the sturdy vehicle, and even with motor cars the general appearance suggests capacity to withstand wear and tear rather than adaptability to road conditions, from the well kept highway to the most primitive road."

WHY THE TIRE MAKERS DO NOT EXHIBIT ANY MORE

The actual cost of making the exhibit is not even a small part of the total expense that is often incurred by many exhibitors during the time of the show. A very large item of expense is the great amount of advertising space taken in local newspapers, besides the enormous amount of advertising matter wastefully distributed to souvenir seekers and catalogue collectors. But probably the chief cause of the withdrawal of so many former tire exhibitors is the great expense involved in having so large a part of the sales force in the exhibition city during the time covered by the show and the necessary preparations, with all the incidental entertainment—the banquets, dinners and parties that seem an inevitable accompaniment of these gatherings, and which when conducted with a free hand reach in the aggregate very large sums.

Among the tire manufacturing concerns which are not exhibiting at the National Automobile Shows this year are the Goodyear, Goodrich, Diamond, Swinehart, Firestone, Fisk, Kelly-Springfield, Ajax-Grieb, Federal, United States, Michelin and the Knight Tire & Rubber Co.

If you have a loose set screw clean the screw of oil and wet it with chloride of zinc, then draw a soldering iron over the threads.

Paint Shop

COST ACCOUNTING IN PAINT SHOP

It is known that many paint shops do not pay. The reason they do not pay in most cases is that the painter has no reliable data on which to base an estimate of the cost to him in labor and material. Often in his locality there is a sort of fixed scale of prices for the work. And it's guess work.

Likely the greatest sufferers from guess work are those shops where every spring fresh workmen are taken on for the season, though in many shops where the employer himself is the boss painter at all times, and for a great part of the year the only one in the shop the chances are that he is often a very much deluded man in the matter of time allowances for the different operations necessary.

Has the painter a regular scale of prices that he has worked out from actual practice, by keeping record of time and material spent on different classes of work throughout an extended period?

There are only a few who can truthfully answer yes, and yet such actual practical knowledge affords the only possible key to financial success in the paint shop. To the biggest concerns in this country, cost is of vital importance, then how much more so should it be to the medium and small shops, where an unlucky guess might wipe out profits entirely.

The forms here presented may not be perfect, but if faithful records are kept on them, they would enable any man to tell just how much he could afford to do on any job for so much money, and, where he comes out a loser (which he need never be when he has thoroughly established this system) he could at once tell how much, and the exact operation that caused it, and need never get caught again. Form B is about as simple and easily understood as can be made and yet give a correct record of the day's work. Just a time card, given to each workman first thing in the morning, with instructions to record on it every job he is called on to do, and how long it took him, and to hand it in daily when quitting work. He should understand clearly that his week's pay will be computed from the figures it contains, so that every hour's time must be accounted for.

From the time of finishing one detail, until ready to begin the next one is one period, and any detail incidental to the operation on hand must be considered as part of that operation. For example, a man is leading a gear, and is afterwards to rub a body out of rough stuff; his time on the gear expires, when, having finished it and set it aside, and having safely disposed of the stock and tools he was using, he is ready to get water, pumice stone, etc. In other words all time spent in getting ready to rub counts as part of the expense of rubbing, so also does the washing off and setting aside of the job to dry out. This is essential; all the getting ready, replacing, etc., connected with a job is chargeable to that job. If not, where, or how recover it? There seems really nothing further to explain about this form.

Let every job that comes into the paint shop have a number, and let every detached part of the job bear the same number. Say a man is set to work first thing on No. 3 to burn off a body, and it takes him two hours, he simply inserts 3 in the first square under the words Job No.; on first line under that 2; under Operations he would write "burn body," and the record would be complete so far as he was concerned. Where an office is part of the premises, the clerk would fill in all required under the head of For Office Use, which in this case might be, gasoline 10 cents, time 50 cents, if paying that man 25 cents an hour. Otherwise the employer at night, or at any other time, could complete the form in five minutes.

The column Odd Jobs would be used to account for small things, such as touching up of repairs, that in many cases never enter the paint shop. Such things spoil a lot of time, and occasionally spoil a man's whole day's work; I mean they make it impossible for him to accomplish what he had intended doing. The responsibility of collecting for them belongs to the employer once the workman has made proper record of them on his time card.

Form A is much more pretentious than is B, and instead of being an individual time card, is a complete job record. It might be kept in the shop by the foreman, or it might in the smaller shops be kept by the employer. One form for each job, to be filled in daily or nightly from the information on form B as a recapitulation that would tend to eliminate all chances of error. It would record perfectly every operation and the time spent on it and by whom. It might be kept in

Time card ..... Date .....

Name .....

My time in the shop today was spent as shown hereon

Operations	Job No.....	Odd Jobs	Totals	For Office Use: Stock Estimated	Time
Totals					

Form B

the shop by the foreman, or might in the smaller shop be kept by the employer.

Daily the estimate of material cost should be entered; almost any man can come within a cent or two of stock estimate, but for at least a time, stock should be balanced about once a month, which is not a big undertaking. The form contains a heading for almost every necessary operation and a few blank lines where others may be entered.

Notice in heading "Commence Painting at X," now, if you have agreed to burn off the body mark X against "burning off" and proceed from that on in any desired way. Body and gear, it will be seen are recorded separately; under the words "Body" and "Gear" are squares in which to insert the dates of operations. The difference between the dates will ordinarily be the time allowed for drying, and may sometime afford a clue to the premature decay of some surface; underneath the date is the time spent in the operation; that and the entry of the workman's name completes the workman's share of the record.

Any painter who will take the little trouble to keep these records, and daily transfer the charges from them to some permanent record against the customer will soon know where he is at in the paint shop.

If any job don't pay he will know why, and the why of many non-paying jobs is, that too much was done to them for the money. In very short time he would be able by means of

Job No. 3 – Rubber tired Top Buggy..... Belongs to..... Salem White.....
Received .. July 5. 1907..... Promised..... July 26. 1907.....
Instructions.... Repaint & finish - same color..... Commence painting at .. X.

Workman	Dates worked on and time consumed: Body	Operations	Dates worked on and time consumed: Gear	Workman
		Unhanging		
		Cleaning up		
		X Burning off		
		Scraping	X	
		Sandpapering		
		Priming		
		Leading		
		Puttying		
		Knifing Putty		
		Rub Lead		
		Filler		
		Rough Stuff		
		Rubbing out Rough Stuff		
		Ground Color		
		Color		
		Color Varnish		
		Massing off		
		Rubbing Varnish		
		Rub out of Rub. Var		
		Striping		
		Finishing		
		Hang up		
		Black off		
		Dress Top, etc		
		Slush Bottom		
		Touch up		
		Lettering		
		Mixing		
		← Estimate cost of stock in these columns daily →		

Form A

records of things that have been done, to say positively what may be put on a job, and what omitted.

The use of the form B would keep any man straight. The use of both would soon put him in a position to know the exact cost of every operation as nearly as can be. There will be great difference found in the speed of workmen. The slow man's time should be the average on which to base an estimate. The slow man at one thing may be the lightning operator at something else. Your records will soon make you wise on that point, and then see to it that the best man on any particular job goes on that job if possible.

Now is a good time to begin this work. No man who tries it with an honest desire to know where he is at, will ever return to guesswork. Make it clear to the painter that your asking him for a daily record is no reflection on his ability or honesty, but simply a necessity to you to regulate your charges to customers, and that every hour must be accounted for. Time that cannot be accounted for is a dead loss to somebody. What some one else can do "cuts no ice," it is what the capabilities of your own men, and your own shop are that may make or break you. Having made the closest calculation of cost, it then remains with you to say what per cent. of profit you deserve. If you don't receive more than just expenses, you are in a losing game. There are many charges to meet, all the way from rent to waste, and when these are all covered there should remain a profit that can either be banked or used to extend the business, but it should be really a profit, and the only way to assure yourself of profit is to know cost. Cost to you commences the instant the vehicle reaches the shop (sometimes before). Too often you are not through with cost when the rig goes out. You may have to spend valuable time collecting. You may never collect. These things must be borne in mind when fixing the percentage of profit to be added to actual costs.

By faithful use of the forms given actual cost is easily learned. Any man who can read and write can understand them and use them.

Nowhere is help more needed than in the certainty of knowledge of costs, and we believe we have indicated how, with a certainty scarcely second to that of having work done by contract or piecework.

STANDARDS PROPOSED IN PAINT SPECIFICATIONS

The American Society for Testing Materials has arranged the table here given as the right terms and definitions to be used in all that pertains to paint. The terms will become official if the mail vote was counted in the affirmative.

Standard—A term designating a quality or qualities specified.

Equal to—The use of this term should be avoided if possible.

Pure—Standard, without adulteration.

Commercially Pure—Is not defined, and should not be used in specifications, as it involves the absence of "Standard."

Adulteration—The partial substitution of one substance for another.

Adulterant—A substance partially substituted for another.

Bulk—The bulk of a pigment shall be considered as the total

volume of the pigment and the voids, and varies inversely as the specific gravity of that volume.

Voids—The space between the particles of a pigment, even though occupied by air or by a vehicle, whether liquid or dried.

Opacity—The obstruction to the direct transmission of visible light afforded by any substance, comparison being made with sections of equal thickness. The opacity in the case of pigments should be considered as referable to their opacity in a vehicle under standard conditions.

Covering power—The use of this expression should be avoided as being confusing.

Hiding power—The power of a paint or paint material, as used, to obscure optically a surface painted with it.

Spreading power—The relative capacity of a paint or paint material, as used, of being brushed out to a continuous uniform paint film expressed in terms of the area to which a unit volume, as used, is applied.

Fineness—A term used to denote the extent of sub-division and expressive of the number of particles of pigment in a unit volume exclusive of voids.

Crystalline—Having a definite structure referable to one of the systems of crystallography.

Amorphous—The opposite to crystalline.

Paint—A mixture of pigment with vehicle, intended to be spread in thin coats for decoration or protection, or both.

Pigment—The fine solid particles used in the preparation of paint, and substantially insoluble in the vehicle.

Vehicle—The liquid portion of a paint.

Volatile thinner—All that liquid portion of a paint, except water, which is volatile in a current of steam at atmospheric pressure.

Non-volatile vehicle—The liquid portion of a paint, excepting water, which is not a volatile thinner by the above definition.

Tinting Strength—The relative power of coloring a given quantity of paint or pigment selected as standard for comparison.

Color—A generic term including the colors of the spectrum, white and black, with a white pigment or paint, the white predominating.

Hue—The predominating spectral color in a color mixture.

Tone—The color which principally modifies a hue, or a white, or a black.

Drying—The solidification of a liquid film, independent of change in temperature.

Drier—A material containing metallic compounds added to paints for the purpose of accelerating drying.

Specific Gravity—The relative of a unit volume of a substance compared with the weight of the unit volume or water at defined temperatures.

Water—Dissolved water, or water not definitely or chemically combined.

Dry—Containing no uncombined water.

MIXING VARNISHES

In earlier days when the science and business of making varnish was more in the nature of an experiment, the painter could rise up and offer certain logical and manifestly sound reasons for scuttling together the contents of two or more varnish cans of different brands, and, not infrequently, different makes.

There were certain fine varnish essentials necessary to develop, we were wont to be told, which only through the medium of mixing could be teased into existence. And under the plea for betterment of the varnish makers' product the nervy game of mixing was diligently cultivated.

In looking over any good list of varnish makers we can think of no reason why the painter should desire to mixe varnishes to produce special results. Every necessary grade and kind of varnish needed may be procured, thus eliminating the necessity of mixing different grades and makes as a means of developing a sort immediately suited to the work in hand. In other words, varnish is now made to fit every particular need of the carriage painting business.

Another aspect of the case has to do with the accountability of the varnish maker and holding him responsible for the character of his product. This cannot be done where mixing of varnishes is practiced, for in so doing the painter plainly relieves the maker of responsibility.

When the manufacturer puts his name on a can of varnish in connection with an acknowledgement of the grade, kind, etc., he virtually pronounces his willingness to stand back of the product in the matter of quality and capacity for performing certain specified functions. This is simply a business-like and legitimate method of marketing goods. In mixing varnishes the painter voluntarily permits the maker or makers of the goods to relinquish whatever obligations may have naturally attached to such goods in reference to their quality and usefulness. And in so doing he assumes the obligation, and makes confession of his desire to improve upon the product of possibly a life-time of study and experiment.

Varnish mixing, in short, introduces an element of uncertainty in varnish room affairs which is alike disturbing and expensive.

WHY SOME COLORS MAKE VEHICLES APPEAR LARGER AND OTHER COLORS SMALLER THAN THEY ARE

Not many persons realize that the color a vehicle is painted has an effect in influencing its apparent size; that bright reds make a car appear really larger than it is; and that dark blues and greens and blacks have the effect of slightly reducing the size of the vehicle to the eye. But that this is true is the disclosure of a paint expert who has made a study of colors both as regards their effect on the eye and their construction, or rather compounding, and their manner of finish.

All of the greys, he says, are neutral in their effect upon the surface—that is to say, they exert no increasing or diminishing effect upon the surface to which they are applied. They are neither cold nor hot in respect to their effect upon the senses, as seasons come and go; they are virtually all-the-year-round colors. They show dirt and surface blemishes less than most other colors, and if applied skilfully they wear well. All of the greys are comparatively easy to apply. Their wearing strength comes from the white lead in their composition. These grey pigments, moreover, in the matter of cost compare favorably with the cheapest of the other colors.

Reds, and notably the light reds, have the effect of increasing the actual size of the vehicle to which they are applied. They have a warm effect in winter and a correspondingly hot effect in summer. While such flaming reds as vermilion wear durably when given good care, the rank and file of these fiery reds fade and lose their original brilliancy after a little time.

Greens and blacks have a diminishing effect upon the surface, but require perfection in surfacing methods, as they show surface defects more freely than other colors. They are, nevertheless, durable colors if kept secure under a strong body of varnish. All of the dark, fine greens, of which there is a noble array, are colorrs of elegance and refinement.

The brown pigment, of which at the present time there are numerous very beautiful shades, are neutral colors in respect to the seasons. They are durable under conditions which would upset not a few other pigments, do not show surface defects readily, are easy to produce on the surface, have strong covering power, show dirt and road service to the minimum extent, and stand up well under cleaning and renovating processes.

There are many splendid lake pigments which are durable under god care. They are colors which require as perfect grounds as is possible. They are negative in their effect upon the dimensions of the car, and for brilliancy of color are unsurpassed.

Although the blues are meeting with favor, they are not, for the most part, colors easy of application. The light blues are less befogged and discolored under varnish, gases, and atmospheric impurities than the darker shades, but all are subject to effects which ordinarily do not disturb most of the other staple pigments. At the same time the blues, almost without exception, are to be accounted durable colors, and when kept well protected under varnish will wear on and on, and have a show of the aristocracy to the end. Surfaces of dark blue appear perceptibly smaller than they really are, while the lighter shades of the color exert a neutral effect.

The yellow pigments are not so much in evidence on the motor vehicle as formerly, being hard colors to bring out to a finish. They show surface defects plainly, but if maintained in good shape during service will wear durably.

White lead, a pigment known as enduring, forms the basis of yellow. Colors compounded from the old-time Dutch-process white lead are certain to result in good pigment. For this reason greys and yellows, and all the blended pigments between these two, are entitled to the distinction of being raw-hide wearing mediums. They require plenty of time to dry—that is assured; and if denied this, they create surface disorders not easily remedied.

The greys and yellows and their intermediate colors reflect the light and heat better than dark colors, and, consequently, if brought up right, fade less. The dark colors invariably absorb more heat than light ones. They also appear to lower the height of the vehicle to which they are applied.

The basis of the green pigments in potash, sulphur, chromic acid, copper, arsenic, and verdigris, combined and varied in methods of manufacture to produce incomparably beautiful effects. Possibly some of the popular greens of the present day contain only a limited percentage of the ingredients. White, yellow, prussian blue, chrome green, golden ochre, burnt umber, and black all contribute more or less to the composition of automobile greens.

COLD THE ENEMY OF VARNISH

J. Cruickshank Smith, in his manual, says on the subject of the effect of cold on varnish that continuance of cold during the period of drying varnish may have the effect of preventing it from drying altogether. In such cases the drying is said to be "strangled," and, as a general rule there is no practical course open in such cases but to wash off with turpentine and re-varnish. The expedient of brushing over the surface with a thin, quick varnish is only an expedient to get over a job quickly, and should not be adopted when good work is in question. Under the head of "Chilling," the author says: Chilling is the term applied to the effect produced on a varnished surface which has been exposed to a draught of cold air during the setting or drying of the varnish, whereby it acquires a non-lustrous opaque appearance. The precise effect depends on the local conditions, and may consist of a dull appearance over the whole surface or, in extreme cases, a rough granular surface due to the deposition of minute particles of resin. Some varnishes are more liable to chill and are much more "tender" than others, and care should be exercised in the selection of varnish for use in situations where cold currents of air may be looked for during the process of drying.

DUST AND VARNISH

Go into a spotlessly clean room that has not been used for weeks. Notice the innumerable atoms of dust which may be seen floating in the streak of light made by a stray sunbeam, and which were invisible otherwise. So, just because you cannot see any dust on the surface of the work, don't conclude that there is none. And these specks of dust, which are invisible when there is no varnish on the surface, will be visible after varnish is applied. When the varnish is put on over the dust specks, it is slightly raised by them, and forms a concave-convex lens, which magnifies the small grain of dust many times, sufficiently at least, until it becomes large enough to be visible to the naked eye, and many such specks make the finished work look seedy.

The thorough removal of dust is impossible simply by sweeping with a duster. The accepted way is to pour a little oil in the hollow of the hand, with which slightly moisten the ends of the bristles of the duster. Then, with a gliding movement rather than a sweeping motion, go over the work several times. The dust will then adhere to the oiled bristles. If one will violently rub the ends of the bristles back and forth on the hand for several moments before moistening with oil, the dust will adhere better. The friction electrifies the bristles, imparting to them a magnetic property which draws the fine particles of dust to them.—The Decorator.

TESTS OF PARA RUBBER-SEED OIL AND CAKE

Samples of Para rubber-seed oil were recently furnished to three firms for trial in the manufacture of paints and varnishes. The results of these trials indicate that there will be no difficulty in finding a market for the oil if it can be put on the market at a suitable price and in large quantities. Its drying properties are inferior to those of linseed oil, but when the latter is high in price the rubber-seed oil would prove a valuable substitute.

Four trials were made with the oil in the manufacture of linoleum, but three of the four firms were of the opinion that it was not suited for the purpose. A firm of oil-seed crushers stated that the oil would be very suitable for the manufacture of soft soap, and for this purpose would be about equal in value to linseed or cottonseed oil.

CONFERENCE ON GRADING ROSIN AND TURPENTINE

In answer to requests for conferences upon the grading of rosin and turpentine, the Department of Agriculture held a public conference on the subject at the New National Museum in Washington, March 5.

New permanent type samples for grading turpentine and rosin prepared by the Bureau of Chemistry were shown and discussed, also certification of type samples by the Department of Agriculture, as is now done with cotton type samples; adulteration, misgrading and regrading of turpentine and rosin; short measure, short weights, and cooperage, were subjects considered.

WHY DOES VERMILION TURN BLACK?

Apart from the quality of the verimilion itself, there are two causes which would account for its discoloration: (a) Insufficient protection by varnish; (b) The presence of lead. Vermilion needs well protecting with a good carriage varnish, at least two coats being necessary. While it is fairly fast to light, it is susceptible to atmospheric influence. No white lead should be used in conjunction with vermilion, either as a ground coat, or in the form of driers.

BANKRUPT

J. E. Huff, wagon maker at Spartansburg, S. C., has gone into voluntary bankruptcy, the outcome of a stormy career following the 1913 flood, which hit the plant, destroying a major part of the stock on hand. Mr. Huff is a son of J. A. Huff, one of Spartanburg's pioneer wagon makers, but now of Fresno, Cal. His father's name was mentioned among the creditors to the extent of $1,450. The total liabilities mentioned in the petition was $5,610.55, with the total assets placed at $1,742.50.

Smith Shop

NECESSARY OXY-ACETYLENE WELDING CONDITIONS

It has been proven that oxy-acetylene welds can be made so strong that the test bar will break outside of the zone of heat; showing that the weld is at least as strong as the original metal. Much has been said concerning this strength of the weld, and a strength nearly that of the original metal can be obtained with this process under the right conditions. In fact, in all welding, these conditions are to be observed.

First, the torch equipment should be adjusted to give a uniform flame under all conditions of temperature; burning the acetylene under the least proportion of oxygen that will give a clear outline of the high-temperature flame (interior cone). If more is supplied, the additional oxygen must pass through the high-temperature flame in its uncombined state and coming into contact with the molten metal practically oxidizes it instantly, which cannot help but affect the strength. As an oxidized weld will be brittle and may be weak, the mixture of the torch should be carefully observed. Careful attention should be paid to the generators, as impurities in either of the gases will produce weak welds.

Second, the operation of the torch is an important factor. Unfortunately, using the torch appears to require little skill. The novice seems to think the movements of the torch are solely to spread the heat; whereas they are more necessary to spread the metal. The weld in steel is made by spreading each drop as thin as possible over a large area; being sure that the metal over which it is spread is hot enough for the two to flow together and that the edges of the drop, instead of being rounded like a drop of water, will be spread out as if the drop had been placed on a piece of blotting paper. It is also necessary to blow away the particles or films of oxide, which are readily distinguishable, as they are much brighter than the metal.

The third factor is the material, fluxes and methods used. The melt bar or feed wire should conform as near as possible to the metal being welded. If it is of a lower tensile strength, or other variations occur, the weld must necessarily be weaker than the original metal. The most common fluxes are salt or borax, and these are used only in certain metals. Cast iron welds easier with a flux, and with steel it has been found to increase the strength of the weld at least 6 per cent. if conditions warrant. With wrought iron no flux is necessary, but the melt bar should be of soft iron. As pure iron is sticky and not very fluid it should be worked or stirred with the end of the bar into place.

Heat treatment should be given to both steel and wrought-iron welds. This consists in working or hammering the joints while cooling, so as to build up the structure that the melting has destroyed. High-carbon steel welds should even be annealed after the heat treatment, so as to build up the strength and elasticity of the metal that has been affected by the heat. Steel takes its structure from the highest temperature to which it has been raised. Unfortunately, the structure produced by the molten temperature is very coarse, which means a lower elasticity and increased brittleness. Consequently, the heat treatment is necessary.

Copper, brass, aluminum and other mtals are special problems that should be attempted only after a proficiency in iron and steel is acquired.

To summarize: the strength of an oxy-acetylene weld and uniform results obtained are merely a matter of satisfactory and uniform conditions, plus the operator's skill in applying these conditions properly.—American Blacksmith.

HOW AN ENGLISH MECHANIC TEMPERS A HAMMER

To temper a smith's or fitter's hammer properly is one of the jobs which many an otherwise good forge-hand either never acquires or foolishly forgets.

First assure yourself the steel is good; next, in the making, take care not to overheat or to hammer when black-red. Assuming this to have been attended to, the next point is to slowly heat the hammer-head to a fairly rich red, and dump into red-hot ashes placed in a pit scraped in the hearth as near as convenient to the fire, and cover up tightly and soundly with fine hearth-ash dust, and allow to remain till cold—say, all night. Dress up.

Now make a hollow fire by the simple expedient of allowing a chunk of wood to burn out in the center of a heaped fire, so as to form an arched cave with an opening towards the front of the hearth. Into this insert your now annealed and finished hammer-head, holding it on a stiff rod flattened at end to loosely fit the edge, and with blast at half-cock let the heat soak well in. While this is proceeding, fill the water trough to within three inches of the brim, flinging into it a handful or two of cheap salt, if it is procurable. When the work is at a rich red heat remove, and by letting the rod rest on the edge of the trough allow the peen end to dip into the water, taking care not to allow the eye port to be touched by the bubbles thrown up.

As the peen end contains much less material than the face, it will be cooled almost sufficiently for tempering purposes before the heat of face shows signs of lessening. When this part has been sufficiently long submerged, and only practice and size of job can determine this, twist the suporting rod so as to bring the face end into the water, always taking care to keep the eye above surface. During this part of the cooling keep a strict watch on the temper color of the peen part, which now begins to creep up, and should it show signs of arriving too quickly it is arrested by a quick twist of the rod on the trough edge, bringing the face momentarily out of the water and the peen in. Usually, however, when the face has had sufficient first dip, the peen is ready for cooling out, while the truly business end of the hammer is closely observed for the correct temper color, and as soon as this arrives twist rod again so as to immerse that end. When the face temper is right, all that is necessary is to continue to rotate the supporting rod slowly, dipping "heads and tails" alternately till the eye has arrived at a safe heat for cooling—i. e., when it is black-hot. This method of tempering hammer heads with good steel correctly handled cannot fail as care is taken to keep the eye walls soft, and the hot-red end, which fits in the eye during the operation, allows of sufficient heat being retained in the job itself to run the temper color to the ends. Though long in the telling, the job is simple in execution, and may be logged as under:

Tempering Hammer Heads—Take good tool steel, do not overheat nor work when black-hot, anneal and finish, heat slowly on rod placed in eye, lay rod on water trough edge and by revolving same cool ends alternately, commencing at peen, never allowing eye parts into water till black-hot, when cooling out can take place.—English Mechanic.

HINTS FOR THE SHOP WORKERS

In arithmetic one man can work more rapidly in decimals or duodecimals; another uses vulgar fractions; each should use the system that he finds is the easiest and quickest for him.

It often happens (as in calculating the strength of materials) that an approximate result is all that is required—it is folly to calculate to four places of decimals if two places are sufficient—and there are a number of formulæ, such as those that give the strength of bars of wood or iron of various lengths or shapes, the weight a spring will safely carry, etc., and these, though giving only an approximate, not an accurate result, are very useful to the practical coachbuilder, who ought to know at once what thickness of steel and what number of plates are necessary to carry a certain load, and so on.

At present there is not a satisfactory formula for motor car springs, as the pace makes a great difference in the shocks caused by inequalities of the road. A car traveling 40 miles an hour requires stronger springs than one that only travels 20 miles an hour, but how much stronger is not generally known.

There are "ready-reckoner" books containing short cut tables that are great time savers.

If we wish to know the length of the bar of iron required for the tire of the wheel we may multiply the height of the wheel by 3 1/7; this gives the length with sufficient accuracy. It is nearly one-fifth of an inch too long in a 5 ft. wheel, and about one-eighth too long in a 3 ft. wheel. If extreme accuracy is wanted multiply the diameter by 3.1416. If we want to find the area of a circle we multiply the diameter by .7854.

We occasionally want to know the area of small circles; for the strength of bars of iron or other metals varies as the area of the section. For instance, a rectangular section bar 2 x 1 in. is twice as strong for a direct pull, lengthways of the bar, as one 2 x ½ in. or 1 x 1 in.

The tensile strength of a bar of iron varies as the square of the diameter.

So that a round rod 1 in. in diameter is four times as strong as one ½ in. in diameter, and 16 times as strong as one ¼ in. in diameter. And the weight also varies as the area, that is as the square of the diameter, so that, if the length is the same, the tensile strength varies exactly as the weight; thus, if three bars of the same length weigh 2 lbs., 3 lbs. and 4 lbs. respectively, the last will be twice as strong as the first, and the second will be only ¾ of the strength of the last.

The strength of iron and steel may be taken as fairly represented by the tensile strain that it will bear.

Iron may stand a tensile stress of 20 to 30 tons, and steel one from 40 to 60 tons; therefore high-tension steel, that is steel that will stand a high tensile strain, is used (in motor work especially) to reduce the weight.

If a bar, or forging, made from iron with a tensile strength of 20 tons, weighs 12 lbs., what would an equally strong bar or forging weigh if made out of steel with a tensile strength of 60 tons?

Here it is evident that a square inch of the iron bears 20 tons, and a square inch of the steel would bear three times as much; thus, one-third of a square inch of the steel would bear 20 tons, and a bar one-third of the area will be one-third of the weight, so that an equally strong bar or forging of the steel will only weigh 4 lbs., instead of 12 lbs. which would be the weight of an equally strong bar of iron.

So, if we multiply the weight of a bar of any given metal by its tensile strength, and divide the result by the tensile strength of any other metal, the dividend will represent the weight of the other bar, which will be just as strong as the first bar—the lengths of the two bars being the same. The relative weights of bars of given strengths will be in inverse ratio to the strengths of the metal comprising them.

If we are asked what weight any bar of iron or steel will bear, we must find out the area of the bar and multiply the tensile stress of the metal by the area.

The safe load or stress on any wood or metal is usually one-half, or on a vehicle moving rapidly only one-fourth, of the extreme load or stress that it ought, by calculation, to stand. For ordinary working loads a safety factor of 3 and 6 for slow and fast vehicles respectively is not too high.

"RULES OF REASON"

The shabby treatment the truck springs receive is the subject of a brown paper talk by the Perfection Spring Co., of Cleveland, O., and the points are alphabetized. Some good points, by the bye!

A—Evenly distribute load. Prevent shifting of load.

B—Do not overload beyond rated capacity. The factor of safety allowed by the maker is for the owner's protection as well as the maker's.

C—A wheel out of round due to flat spots on a solid tire, imposes a severe and dangerous shock upon the springs. Keep the wheels round.

D—Keep excessive side play out of shackles and hangers to minimize the lateral shock on the springs when on rough roads.

E—Give careful attention to all parts subject to friction. Keep them amply lubricated, as an excess of grease keeps the dirt out.

F—Take corners slowly, with or without load.

G—Back into a curbstone or platform gently, as your radius rods might buckle and throw the jolt upon the springs. In driving the front wheels against a curb, or any obstruction, the shock must be taken by the springs alone.

H—When loaded, drive gently over rough road or obstruction, remembering your frame is rigid and the springs must take the distortion.

I—Drive at moderate speeds at all times. Remember your solid tires have little resiliency.

J—If you have to tow a car or, have your car towed, hitch the tow-rope to the frame—not to the axle.

K—If an accident occurs, and a spring hanger, or the frame near the hanger is bent, have it straightened at once. A spring distorted by a bent hanger is liable to break under load.

L—When adjusting chains, remove a link when the adjustment would throw the shackles to a bad angle.

M—Keep spring clips tight at all times. If a center bolt should break, due to loose clips, replace it at once.

N—On a crowned road, drive as nearly in the center as possible, as driving to the right throws an extra load on the right hand springs.

O—If a plate breaks, have it repaired by a competent spring maker at once, or the other plates will break in turn.

P—Tighten or replace loose or broken rebound clips.

Q—Keep sober, as an intoxicated driver breaks more springs than rough roads.

CYCLE CAR SPRINGING

There is not the least doubt that one of the most important features in the design of a cyclecar is the method of suspension, says The Light Car and Cyclecar. Upon this excellence depends a number of points. It materially affects the life of the tires.

The comfort of the passengers, the amount of vibration and the general performance of the car are all effected by the method of suspension which the designer adopts. It will therefore be evident that the subject is one which merits considerable attention.

The number of different types of suspension from which it

is possible to choose is very large. Each has its merits and demerits, and it is very difficult to decide which system is really the best.

In springing systems the semi-elliptic pattern is apparently the most popular. The transverse type of spring in the case of cyclecars is popular. A disadvantage which it possesses is that, as a rule, radius rods are required.

The full elliptic pattern is rapidly dying out, as, unless it is extremely carefully designed, side sway is set up on corners. This type of spring is not suitable for transmitting the drive. It is also a somewhat expensive type to manufacture.

The cantilever type is undoubtedly one of great excellence, as it gives a most luxurious suspension. To give the best results it must be carefully designed, and radius rods should always be used, while the spring should be pivoted at its center. This system is often known as the Lanchester method, after the famous car which is its most prominent exponent. A development of this type is the quarter-elliptic spring, which can also be made to give most satisfactory results. It is well carried out in the case of the Wolseley-Stellite.

INJURY TO STEEL

In a paper read before the Institution of Engineers and Shipbuilders in Scotland, on the subject of "Some Causes of Injury to Steel After Manufacture," Dr. Cecil H. Desch said that the most common error of heat treatment, as far as mild steel is concerned, is that of over-annealing. The change produced by over-annealing is a purely physical one, and is to be distinguished carefully from burning, which is essentially a chemical alteration of the steel. Over-annealing results in a deterioration of the crystalline structure, the crystalline grains becoming much larger, and, at the same time, more regular in outline, so that the interlocking boundaries which contribute to the mechanical strength of the steel are replaced by simple polyhedral forms of small mutual cohesion. Other changes of importance proceeds simultaneously with these. The carbide, which has been fully disseminated through a mild steel as a constituent of pearlite or sorbite, segregates to form granular or modular masses, or even films separating neighboring crystals. Again, if this steel is one which has been previously cold-worked, the growth of the crystals during over-annealing is very apt to be accompanied by a change of orientation, such that all the crystal grains come to have a similar orientation—a condition extremely favorable to brittleness.

THOUGHTS FOR SMALL SHOP OWNERS

What should such men get out of their businesses as a fair return for their labor and skill? This is important to know and one man has had thoughts about it, which bear repeating, for the benefit of others.

There should be some kind of a standard to work up to. Without a standard to compare with or a goal to strive for, a man is only drifting.

In making up your annual balance sheet add to all other charges a salary for yourself. Base the amount of this on a comparison of what your best-paid man does for his wage and what you do yourself. Or shape it by what is paid to managers of businesses where the responsibility carried is equal to what you carry.

Having allotted your own salary, calculate what per cent. of dividend on the capital in use in your business could be paid with the remaining profits (if any).

Now, take note of the published balance sheets of public manufacturing companies and compare your dividend with the dividend they are paying. Also ask the most successful men in your own trade what they are paying. If you are beating the lot you are a phenomenon. If you are not making more than the money would earn on mortgage, shake things up.

ALUMINUM IMPROVED BY ADDING COBALT AND TUNGSTEN

Cheapening of cobalt—mainly through the expansion of cobalt mining in Canada—has brought the remarkable properties of this metal as an alloy strongly into the foreground. High-speed steels have been greatly improved by its use. Non-corrosive cobalt-chromium-iron, with some carbon, rivals steel in hardness and toughness. And lately it has been ascertained that aluminum with an alloy of 8 to 12 per cent. of cobalt can be rolled and forged, while of coarse crystalline structure and not much stronger than ordinary commercial aluminum. This discovery was followed by the more important one that a further addition of about 1 per cent. of tungsten refined the structure and almost trebled the strength of the metal, while the ductility remained. The alloys with 8 per cent. cobalt are most ductile, while those with 10 per cent. or more are less easily forged or rolled but stronger and more suitable for castings. Molybdenum produces effects similar to those obtained from tungsten in similar quantitiy.—Electrochemische Zeitschrift.

THE USE OF DRY LUBRICANTS

Dry lubrication can be used with a good many things, either plumbago or steatite being used, and in regard to this some little skill has to be exercised, says an exchange. Either the lubricant can be used absolutely dry or mixed with just enough tallow to prevent it from flying about. The object is to obtain as little friction as possible, and to do this two polished surfaces are necessary, and to these must be added a greasy working lubricant such as those mentioned, with or without some greasy adhesive to prevent them from blowing away. Where it does not matter about the dust it is better to do without the adhesive; but where tallow is used, the smallest amount possible to effect its purpose should be used, and to facilitate the work of mixing, the tallow should be melted and the lubricant warm.

SPEED OF SMALL CIRCULAR SAWS

It is a remarkable fact that in the use of small circular saws very little attention is given to speed at which they run. Yet this is one of the most important matters to be considered in connection with their use. A 12 inch saw should have a speed of at least 3,500 revolutions per minute. Where fast work is required, better results can be obtained by having a speed of 4,000 revolutions.

Experience teaches us that if saws are run at the speed for which they are adjusted they will cut faster and smoother, and the general results obtained will be far more satisfactory than if run at a lower rate of speed, and that the arbor be not permitted to heat the saw at the center. If these precautions are taken there will be far better results obtained and fewer cracked saws.

REMOVING RUST FROM STEEL

A quick method of removing rust from steel parts, which is not generally known to machinists, is outlined in the following: Rub the surface of the piece of work from which rust is to be removed with muriatic acid. A convenient way to do this is to dip a match or other small stick into the acid and rub it over the surface of the work. This procedure is continued for several minutes, dipping the stick in as often as necessary to obtain a sufficient quantity of acid. After this treatment has been completed the work should be washed with a solution of common washing soda and water and then dried in sawdust.

This will leave the work free from rust and scratches, but with a dull gray surface. The surface of the metal can be restored to its original color by a little rubbing.

PRESSED STEEL WHEEL

A new metal wheel is trying conclusions with the wood wheel, with what success remains to be determined.

The no-felloe wheel, as it is named, is made up of two pressed steel halves, the dividing line passing through the center of the wheel at right angles to the axle. The two halves are welded together, and when this has been done the spokes have the form and the general appearance of wood spokes. The end of each spoke is fitted with a pressed steel cup which sets in the open end, and with a clip and bolt, the two latter for gripping the rim.

The rim or channel in which the tire is mounted has on its inner circumference two annular grooves. The clips in the ends of the spokes grip these grooves and hold the rim securely. The clips, when the bolts are drawn up tight with a wrench, exert an extremely powerful wedging action, pressing outward against the rim and at the same time automatically centering it. The wedging clip comes under the rim on one side and on the opposite side there is a stationary lug which is part of the pressed steel cup inserted in the end of the spoke. The permanent lug is on the inside, so that when the clip bolts are loosened the rim can be slipped off, the clips dropping sufficiently for the purpose.

STEEL TIRE COMMERCIALS

There has been much experimenting in France with steel-tired commercials carrying three and five tons.

One of these trucks has the motor under the driver's seat. The real feature is the carrying of the engine on a sub frame, parallel with the main frame side members, attached by coil springs. This isolates the vibration of the chassis. The carburetor is modified to run on gasoline, kerosene or benzole. The two latter have to be warmed by the exhaust.

Metal wheels have not been found as good as wood. They are wanting in elasticity.

DRILLING SPRING STEEL

The other day I was trying to drill holes in a spring, says C. W. M. Burroughs, but it was no use, they were harder than the drills and I gave it up, and turning to an old machinist, said, "If you know any way that I can drill holes in that spring, let's hear from you." He replied, "If you had some wood alcohol, perhaps you could drill it." I doubted it, but thought I would try it. I got some wood alcohol and presently the drill did the work. Again, when trying to tap a thread in cast iron, the hole was a little too small for the plug tap, so that it stuck and would not go. I tried the alcohol on the tap and experienced one of my happy surprises in finding it take hold so easily.

DIVERTING DRILL POINT DIRECTION

After the drilling of a hole has been started, it is possible to change the location slightly, provided the edge of the drill has not reached the surface of the piece being drilled. A deep center-punch mark in the depression that has been cut, a little further in the right direction than the drill should move, will "draw" the point. A very slight cut after this will show whether the drill is following properly, and if it is not another center-punch mark can be put in. Once the edge of the drill—that is, the outer circumference—gets below the surface, however, "drawing" is impossible.

SMALL TOOLS THAT BREAK EASILY

Drilling and tapping small holes in metal that is fibrous rather than granular—copper, for instance, or steel—it will be noticed that particles of the metal cling to the tool and tend to clog its progress seriously. In fact, there is danger of snapping it off, especially in the case of the tap, if the cuttings are not cleared away occasionally. The deeper the hole to be drilled or tapped the greater the danger, of course, and as it is difficult enough to prevent the breakage of small taps and drills at the best, it is well to have an eye to the matter when working in the "sticky" metals.

FOREIGN SUSPENSION

The most popular type of spring at the present time is the semi-elliptic. The platform type has disappeared entirely; the three-quarter elliptic is seen in smaller numbers than a year ago. The semi-elliptic spring of today is a far different thing from that of two or three years ago. It has been made longer, broader, with thinner leaves, and with a greater number of leaves. There are cars with springs having 15 to 20 leaves.

GOOD PIPE WRENCH

A pipe wrench of unique design and construction is that known as the "Radial" (English patent). As shown in the drawing there are no thumbscrews or springs utilized in its construction. The jaws of the tool are so linked up that an instant grip is obtained on the pipe or other object being operated upon, and the more the greater the hold.

SUBSTITUTE FOR A REAL ANVIL

One of the most unsatisfactory things in the world is to try to do hammer work without something for an anvil. Without a weighty object as a backing little can be accomplished. While most any heavy chunk of iron or steel answers the purpose, there is nothing much better than a section from an old steel rail.

HELPING ALONG THE HACKSAW

The work of a hacksaw in wrought iron or steel will be much facilitated if a little oil is used, just as oil is used on a drill or lathe tool. The teeth cut better and keep cooler.

AHR & ROST IN RECEIVER'S HANDS

On application of John Ahr and George J. Rost, principal stockholders of the carriage manufacturing company of Ahr & Rost, Cincinnati, O., Insolvency Judge Warner named Charles Cunningham as receiver for the business on February 16. Ahr & Rost filed the suit as the owners of the majority of the stock, the company being a $25,000 corporation, with but $15,000 issued, however.

The concern owes an aggregate of $47,832.33; has assets, it figures, as worth nearly $50,000, and has contracts on hand for over $50,000 worth of new work. However, inability to dispose of the balance of its capital stock and thereby secure a sufficient working capital, coupled with a tight money market and inability to secure loans from banks, or to discount the commercial paper it receives, was given as the reason for asking the court to take charge of the business. The heaviest creditors of the company are L. W. Radina & Co., and L. W. Radina, individually. Mr. Radina holds five shares of common and ten shares of preferred stock of the company. The bond of Receiver Cunningham was fixed at $25,000. Schorr & Wesselmann, attorneys.

WILL MAKE DETROIT HEADQUARTERS

Charles S. Monson will represent the Union Auto Specialties Co., of Brookville, Pa., as general sales agent for Union wind shields, with headquarters at 1216 Dime Savings Bank Building, Detroit, Mich.

Wood-Working Shop

CANVASING PANELS

Canvasing panels is primarily for strengthening purposes and to prevent splitting. The fabric chosen for this purpose should be of open texture, so that it will not pull the panel in drying, but the individual strands should be strong. The panel is painted with hot melted glue, and the material, first soaked in glue, is then spread over the panel. If smoothed with the hands, and rubbed until the glue commences to lather, so that it is worked into the grain of the wood, cloth, glue and wood, when dry, appear all solid together.

The method of glueing is generally the same in all shops, comments Cooper's Carriage Journal. Where practice differs is in the fixing of the glued panels. In one case the panels may be fixed first, and the canvas cut to shape and laid on between the framing; in another the panels will be canvased, and then fixed while the glue is still soft; while in a third case the panels will be left until the following day, for the glue to dry and then be fixed. Each of these methods would be a mistake, for by following any of them, the panels would contain moisture from the glue, which would dry out after they were fixed, causing open joints or splits (due to shrinkage), or, if painted immediately, would cause the paint to shell off.

During the glueing, the dry panels are sure to absorb moisture and swell, so that they should always be dried (and shrunk) before being fixed. Precaution should also be taken to prevent them warping. An approved method is to get the panels out to an approximate size, glue and canvas them, and lay them over each other, divided by one inch skids placed about one foot apart, and each row of skids over the lower ones (as in seasoning). Stouter skids are placed top and bottom of each row, projecting beyond the intermediate ones and having holes in their ends through which to pass long bolts, so that all the panels can be clamped together. They should then be placed in a warm dry room for several days, to harden and dry out the moisture. Of course the skids will be stuck to the glue, but as it is not worked into the grain (as it is with the panels) they may easily be knocked off. When quite dry, the panels may be fitted, fixed, and receive a coat of paint.

WOOD WORKERS SHOULD KNOW

That a large chisel will do better work than a small one.

That chiseling across the grain is possible and correct in many cases.

That a mallet should not be used except for heavy duty.

To watch the chisel edge, not the handle, when using mallet.

That mallet or hammer should be held one-third the handle length from end.

That a bevel should not be called a "bevel square."

That gauge and square are useless if not used properly.

That they should be held firmly against the work when testing or gauging.

That the gauge point should be filed like a knife edge and should actually cut a line.

That the gauge point should not project beyond 1/16 inch.

That the gauge should be tilted slightly in direction of motion.

That a screwdriver should never be sharpened like a wedge.

That a block should be used when sanding flat unfinished surfaces.

That sandpaper should be torn into rectangular pieces to fit block.

That a sandpaper block should always be of soft wood.

That no sanding should be done until all tool work is finished.

That worn sandpaper becomes useful later.

That direction should not be reversed when drawing out bit.

That a properly filed bit needs little pressure.

That holes are generally measured center to center.

That the use of a file be avoided wherever possible.

That a file when used cuts only one way.

That grinding without water heats to a blue and destroys temper.

That "sharpen" does not mean "grind."

CUSTOM BODY WORK

The custom body builder is compelled to build bodies to meet the requirements of owners rather than those laid out according to laws of averages and intended for any person. This necessity of building to meet the individual, occasioned by the fact that the buyer prefers to purchase a chassis and add the body and its equipment himself, has resulted in a greater versatility of design and equipment. This is not due to any special originality on the part of body builders, but rather to their being adept in working out the finer details that appeal to the whims of the individual.

The adoption of the all-steel body shell, in which all of the panels are autogenously welded together, has made it possible to carry the tubular side and rounded corners to an extreme. The curve is everywhere and the straright line nowhere. The one-piece body has reduced weight and added strength.

The cabriolet has been joined by the semi-cabriolet, the saloon cabriolet and in the landau ranks are such new types as three-quarters landau, saloon landau, limousine-landau and other types. The campaign with the convertible body has been to eliminate rattle with the top down. The art of the coach builder has come to the front in this respect and the folding top of the cabriolet is so designed and executed that when up it affords the comforts of the limousine and when folded can scarcely be distinguished from an open touring car.

The saloon body in limousine, landaulet, coupe and cabriolet lines is one which must win out in that it is designed to fill a place as a family car that can only be equalled by the single-compartment type of body seen in all too few numbers during the past seasons. In this body the ability to remove the partition in rear of the driver and obtain a one-compartment vehicle is a step in harmony with self-starters and automatic lighting, in that it enables the owner with his friends to use the car with a luxury almost as great as that with the limousine and driver.

THE WHEEL AMONG GREAT INVENTIONS

A recent writer has said the invention of a means of producing fire and the wheel are the greatest of inventions. Carlyle said: "No machine they showed me at Birmingham can be put in comparison for ingenuity with that figure of the wedge named knife, of the wedges named saw, of the lever named hammer. Nay, is it not with the hammer knife named sword that men fight and maintain any semblance of constituted authority that yet survives among us? The steam engine I call fire-demon and great, but it is nothing to the invention of fire."

The use of fire and the lever, the hammer and the wedge in one or more of their numerous forms, is as wide as humanity.

We are so familiar with them that, like air and water, they are indispensable. In ancient times and among primitive people fire was and is valued almost above anything which it is in man's power to produce, and next after fire were the various implements embodying the principle of the wedge. The wheel is less widely found. It, however, is very ancient. In the myths which tell all that is known of the invention of agriculture, Iriptolemus is supposed to have had the use of a celestial chariot with which to distribute corn for sowing throughout all the earth. The coachbuilder and wheelwright have therefore a very ancient lineage.

The coach wheel is a wonderful piece of mechanism. It probably had its origin in the chance movements of a log, which was more easily moved by rolling than in any other way. Then in a section of a log. The axle probably did not come until long after the roller. The invention of the axle marked an immense advance, then the axle box, and later the endless tire; and last, and perhaps more important than any other single feature, since it made the motor car possible, the pneumatic tire.

Altogether, the modern wheel is the product of a vast amount of ingenuity. The discovery of methods employed for using to the best advantage the physical properties of the materials available. The nave, with the fibers of the wood parallel to the axle. The nave band to prevent the wood from splitting. The spoke, with its fibres arranged where they best resist the stresses the wheel is subjected to. The felloes and their dowels; and, lastly, the endless tire and methods of putting it on. Altogether they constitute a device which is rightly reputed amongst the greatest achievements of mankind.—Australasian Coachbuilder.

LANCEWOOD

Lancewood has for years been well considered timber for shafts of light vehicles. When at its best it is very tough, hard, and flexible. It bends well in a green state, but when thoroughly dry is practically useless for bending. Being a tree which only grows to a diameter of about six inches, it is only possible to get one pair of shafts out of each spar, so that the pith, or heart, is often seen on the underside of each shaft. The best lancewood comes from Cuba. Philippine lancewood is not so clean as Cuban, but has numerous small knots, which, although in many instances only as big as a pin's head, are yet very obvious when the shaft is bent, as the surrounding timber opens, and forms a small wavy shake.

The greatest enemy of lancewood is moisture, which, when allowed to operate the grain, soon causes deterioration, so that bolts and screws are best avoided as much as possible when fixing, and resort made to clips. Shaft leathers are also a danger, as they will retain moisture, and shafts will often break at the leathers; still, customers insist on them, so that all that can be done is to see that there is plenty of lead paint under the leathers.

FOREST FIRE DAMAGE KEPT DOWN

Notwithstanding the great increase in the number of fires in 1913, Forester Graves considers that the showing made by the forest service was quite as favorable as that in the preceding year, because the damage done and the costs of fire fighting were no greater proportionately than in 1912. In both years practically 50 per cent. of all fires were detected and extinguished before they burned over a quarter of an acre, and 25 per cent. of both years' fires were put out before they covered ten acres. Of last year's fires, 3,278, or considerably more than the whole number of fires in 1912, were confined to areas of less than ten acres, and in 1,080 additional fires less than $100 damage was done by each. In only 25 fires did the damage amount to $1,000.

The aggregate loss in timber is estimated at nearly 50 million board feet, valued at about $82,000, and the damage to young growth and forage is estimated at about $110,000, making a total of about $192,000. About 18 per cent. of this loss, however, was incurred on private lands within the forests where 16 per cent. of the fires had their origin.

NEW TYPE OF WAGON

"Much interest was aroused Friday afternoon in Urbana by the exhibition of a wagon built in the shop of F. M. Foltz on North Market street," says the Champaign (Ill.) News.

"Unlike the ordinary farm wagon, this wagon can be drawn from either end, both trucks turning and being provided with a groove for the insertion of the tongue. The front and rear trucks are fastened together with chains that cross in the middle of the reach, but held in position by pulleys fastened to the reach. These chains cause the two pairs of trucks to operate in such harmony that it is possible to turn the wagon completely around in half the space ordinarily required. Measurement between the tracks in a short turn made Friday showed that the diameter of the circle made by the inner wheels was thirteen feet. In turning, the front and rear wheels "track," that is, instead of making four tracks, almost parallel, they make only two. The wagon was invented by George Bulles, of Aurora."

SOME OF THE KINDS OF METALS USED FOR BODY WORK

Planished steel sheets for carriage work; lead-coated steel utilized in the manufacture of gasoline tanks; terne sheets, coated with a mixture of tin and lead used very largely for body work and mud guards; tinned sheets coated with pure metal and having a very smooth surface; also mild-steel black sheets left uncoated. This latter class of material is well adapted for making under-shields, silencers, and work where outward appearance is not important.

The steel sheets for carriage work are annealed, in order that suitable body curves and panels may be readily hollowed out under a hammer or press. For char-a-bancs body work, the tinned terne and lead-coated sheets, being rustless and unaffected by exposure to the atmosphere, prove an advantage over panels made of aluminum.

BEGINNINGS OF THE HEARSE

The hearse was formerly a framework for setting candles as used at some offices of the church, and particularly at funeral services, where hearses of great splendor were placed over the bodies of distinguished persons. Portable hearses for the reception of coffins, and having covers with fittings for candles, were used to carry corpses from the house to the church, where candles were lighted. They were the origin of the modern hearses. The number of candles being the great distinction of the funeral, the name of the frame which bore them came to be used for the whole funeral obsequies, or for the cenotaph at whose head it was placed, and finally for the funeral carriage.

WHY CARRIAGE CLOTH IS FAST DYE

The superiority of the cloth which is used in first class carriage work lies in the fact that, no matter how long it is used it will retain its color, and it will never acquire that white look that is so common in cheaper grades. Some are inclined to think that this excellence is due to the better quality of the dyes used and pure water, but such is not the case. The whole secret lies in the fact that the cloth is subjected to a bleaching process that extends over a period of two years, and consequently every particle of oil is obliterated. In that condition the dye has a chance to get a firm hold, and the consequence

is that the cloth never fades. Cloth made otherwise may be finished with just as good a dye, just as good water, and just as good workmen, but less time is expended on the manufacture, and consequently the cloth soon acquires a white and shiny appearance that is far from desirable.

VEHICLE DRAFTING SCHOOL FOR ST. LOUIS

The public school board of St. Louis, Mo., has opened a class for instruction in drafting of carriages, wagons and automobiles. The instruction will be given in the Central High School Building, Grand and Finney avenues, and the first session of the class was held on Monday evening, February 23, starting with 45 pupils. Herman Klix and F. M. Roehlk, practical body builders, have been engaged as teachers. The St. Louis Carriage, Wagon and Automobile Builders' Club, through a special committee, has sent out a letter to all members advising them to encourage their sons, apprentices, workmen and others interested to take up this important study.

PHILADELPHIA SCHOOL OF VEHICLE DRAFTING BEGINS SECOND TERM

The technical school for vehicle draftsmen and mechanics in Philadelphia, has completed its first course, and commenced its second series of lessons. Thomas O. D. Grier has been engaged as associate teacher. He has had nearly 30 years' experience as a practical body builder and foreman, of which 15 years were in Sowney Bros.' shops, six with Joseph J. Dernham, and six with the Cadillac Automobile Co.'s Philadelphia branch. He is now with the Broad Street Top Co., 1805 Market street. Mr. Grier assumed his duties as associate teacher on the evening of March 11.

MITCHELL-LEWIS MOTOR CO. SELLS THE WAGON PLANT

H. L. McClaren, president of the Mitchell-Lewis Motor Co., announces that the company has sold its big wagon plant, also located at Racine, Wis., and will permanently retire from the wagon business, devoting its entire attention in the future to the manufacture and sale of Mitchell automobiles.

The consideration involved in the sale is private, but by the transaction the motor company added to its operating capital $2,700,000.

WILL MOVE TO ELKHART

The Ideal Steel Wheel Co., whose factory is at 4616 Spring Grove avenue, Winton Place, Cincinnati, has decided to locate at Elkhart, Ind., The move will be made in the near future. The board of directors, in deciding on the move, were actuated they say, by a desire to locate near the Detroit automobile market, by the receipt of flattering inducements from Elkhart, and by the placing of several large orders for the steel auto wheels manufactured by them from Elkhart concerns.

The company reports that it has closed contracts with several automobile manufacturers for the use of its steel wheels on their automobiles. New capital from out-of-town sources has been interested.

The officers are O. G. Harrison, president; E. H. Maffey, secretary and treasurer, and T. B. Mills, general manager. M. E. Crow, president of the Crow Motor Car Co., of Elkhart, is a director in the company.

PALMER-SINGER CO. BANKRUPT

Efforts at a successful reorganization of the Palmer & Singer Mfg. Co., Long Island City, N. Y., having proved futile, the company was placed in the hands of a reciver in bankruptcy March 3. One of the three petitioners was Charles A. Singer, Sr., the president of the company, who is said to have sunk $1,000,000 in the business since his first connection with it.

Singer, who holds the largest portion of the company's $1,000,000 of stock, is reentering the automobile industry with another and perhaps similar car, but those close to the company's affairs state that the present move will likely lead to the winding up of the present Palmer & Singer industry. His new car, it is stated, will be known as the Singer car.

FEDERAL GRAND JURY INDICTS V. L. PALMER

Victor L. Palmer, formerly financial head of the Michigan Buggy Co., was arrested on March 2 by a Deputy United States Marshal on a charge of using the United States mails for fraudulent purposes.

He was released on $10,000 bail, furnished by relatives, to appear in federal court at Grand Rapids. He is now under $25,000 bail on charges preferred by the special county grand jury.

It is understood that the federal charges grow out of the alleged misleading statements sent to banks relative to the condition of the Michigan Buggy Co. It is alleged one of these was sent out when the company was not solvent.

GERBER MADE PRESIDENT OF ABBOTT CO.

Following the acquisition of the Abbott Motor Co., Detroit, Mich., and all of its property by E. F. Gerber, Pittsburgh, and his associates, which deal was consummated last November, Gerber has been elected president of the company. The other officers are Francis B. Fick, secretary and treasurer, and Morahn J. Hammers, vice-president. The factory is being enlarged and an increased output is planned.

FRENCH AUTOMOBILE TRADE

The year 1913 was a favorable one in the automobile trade of France with foreign countries, both imports and exports showing a material increase. There was a general increase in imports from all the principal countries, but exports to the United States, Belgium, and Great Britain fell off, although those to all other countries showed increases.

PAYMENTS TO CREDITORS

The Detroit (Mich.) Trust Co., as receiver or trustee, is preparing to make disbursements to the creditors of two companies. A second payment of 5 per cent., amounting to about $150,000, will be made by the company as trustee in bankruptcy to the creditors of the Michigan Buggy Co., Kalamazoo, Mich.; a similar payment was made a month ago. A third and final dividend will be paid by the company, as receiver, to the creditors of the New Process Steel Co., formerly in Marshall, Mich.

J. P. SJOBERG CO. ASSIGNS

The J. P. Sjoberg Co., Seventieth street and Avenue A, New York City, has assigned for the benefit of its creditors. The company announces that the business has been losing ground for some time, but, in the hope that an improvement would occur, it has continued at a loss until now it is inadvisable to go further. The directors decided that the best interests of the creditors would be promoted by an assignment, and that course has been pursued.

WILL TRAVEL FOR BROCKWAY

S. J. Crutcher, who has traveled for the Columbus Buggy Co. for the past 17 years, has been engaged by William N. Brockway, Inc., of Homer, N. Y., to represent them in Kentucky, Tennessee and Arkansas.

NEW YORK STATE DEALERS' CONVENTION

The annual convention of the New York Retail Implement and Vehicle Dealers' Association was held at Syracuse, February 4 and 5. Papers were heard from several of the members and visiting dealers, a "question box" was operated and a big banquet held in the evening. The election of officers resulted as follows:

President, Wm. Hirsch, Batavia; vice-president, C. E. Leggett, West Byron; directors, Truman Cole, Little Falls; Edward Brown, Tully; A. M. Griffin, Carthage; Henry Hetherington, Syracuse; A. E. Davis, Binghamton; A. E. Marshall, Lyons; D. D. Costello, North Manlius; Frank Howe, Poland. At a meeting of the directors following the convention, Henry Butts, Sodus, N. Y., was elected secretary-treasurer.

NEWARK AUTOMOBILE SHOW

Greater in size, completeness and brilliancy than any of its predecessors, Newark's (N. J.) seventh annual automobile show was opened in the First Regiment Armory at 8 o'clock Saturday night, February 21. State Motor Vehicle Commissioner Job H. Lippincott pressed the button to turn on the electric lights, marking the formal opening of the greatest display of motor cars and trucks seen in the state, and one that will take rank with the best in the country. More than 40 different makes of passenger cars, 18 different makes of commercial vehicles, and close to half a hundred exhibitions in the accessory department were on display. The estimated aggregate value of the exhibits has been placed at $1,000,000, and the show has been called Newark's million dollar exhibition.

HORSE SHOW FOR PEORIA EXHIBITION

The directors of the National Implement and Vehicle Show, of Peoria, Ill., have decided to add a horse show for the coming exposition. Cash premiums to the amount of $3,000 will be offered. The show will include high bred imported stock, heavy and light draft horses and ponies.

Another new feature will be motorcycle races, which will be in charge of the Peoria Motorcycle Club.

RECEIVERS FOR EBERLY & ORRIS

On March 2 the court appointed receivers for the Eberly & Orris Mfg. Co., wheel manufacturers of Mechanicsburg, Pa., on motion of S. E. Basehore and S. B. Sadler. J. C. Lamber, representing the corporation, and D. W. Sunday and George E. Lloyd, representing the stockholders and creditors, were appointed by the court, and their bond was fixed at $40,000, and approved by the court.

The Eberly & Orris Mfg. Co. was organized in 1906. Lack of current funds necessary for conducting the business was the cause of the present action. As there are no mortgages or liens against the real estate of the company, it is thought that the creditors will be paid in full, and that the stockholders will receive considerable proportion of their investment, if it should be found necessary to sell the plant. By the present proceeding it is hoped to make a sale unnecessary and to allow the business to be conducted until arrangements can be made for paying off the indebtedness. Large orders are on hand amounting to at least $50,000, and these will keep the plant going for some time to come.

FORD ASSEMBLING PLANT FOR CINCINNATI

The Ford Motor Co. has closed a deal for the purchase of more than an acre of ground in Cincinnati at the northwest corner of Lincoln avenue and the C., L. & N. railroad upon which the Ford company will erect an assembling plant. The structure will probably be five stories high with a craneway running the entire length of the building. About 150 persons will be employed and the plant will have a capacity for assembling 10,000 cars annually.

GOODYEAR TO SELL $4,000,000 STOCK

The Goodyear Tire & Rubber Co., Akron, O., at a special meeting held on March 3, unanimously approved the plan of the directors calling for the sale of stock to the amount of $4,000,000. It is stated that already 80 per cent. of the stock to be offered has been subscribed for by present stockholders and it is expected that the balance will be taken by them before their rights to it expire. As an indication of the manner in which the company's business has grown, it is stated that during the past three months the number of tires sold, as compared with the same three months for the previous year, have increased by 47, 55 and 82 per cent., respectively. It is expected that the pneumatic tire business shortly will reach 10,000 tires a day.

BROKE RECORD FOR FEBRUARY

Business at the Gerstenslager buggy factory, at Wooster, O., is on the boom and the prospects for a banner year were never better.

The record for the month of February greatly exceeded the number of buggies sold and delivered for the corresponding month for previous years.

ESTABLISHING BRANCHES

The Deeds & Jordan Buggy Co., Nashville, Tenn., announces the opening of another branch house, the last being at Ashland City, with A. H. Williams in charge. The company has also opened a branch at Lebanon. It is the company's intention to open other branches as fast as competent buggy men can be secured to take them in charge.

STUDEBAKER PROFITS FOR 1913

The gross business of the Studebaker Corporation during the calendar year 1913, according to its report to its stockholders, totaled $41,464,949.81, as compared with $35,440,327.41 in 1912; this is an increase of 17 per cent. and is the largest volume of business in the history of the company. The net profits from all sources, after payment of interest, were $1,772,473.65.

CHANGED POSITIONS

O. C. Wiliams resigned his position at the Henney Buggy Co., Freeport, Ill., where he has been assistant superintendent for the past three years, and moved to Owensboro, Ky., where he has accepted a position with the Ames Vehicle Co. as sales manager.

ANDERSON GEAR BUYS A PLANT

The Anderson Roller Gear Co., of Cleveland, O., has purchased the plant and property which it held under lease and option and which previously was owned by the Cleveland Drop Forge Co. The property is located in the new Cleveland gas field.

NEW PARRY TRAVELER

The Parry Mfg. Co., Indianapolis, Ind., announces the appointment of H. O. McDaniel, of Lynchburg, O., as representative in northern Ohio and western Pennsylvania. Mr. McDaniel will succeed the late Edward Chew. He has been engaged in the implement and vehicle trade for many years and formerly traveled in Ohio.

OBITUARY

H. L. Atwater, formerly president of the Georgia Buggy Co., and a resident of Atlanta for 40 years, died February 20.

Darius H. Briggs, 88, who conducted a carriage business in Attleboro, Mass., for many years, died February 19.

Millard F. Blaine, 65, until recently president of the Geneva (N. Y.) Wagon Works, died February 12 after a long period of ill health. Mr. Blaine organized the wagon company in 1891, and in the early years of the organization was secretary, treasurer and general manager, but latterly president and treasurer. He continued his official connection until December, 1912. Mr. Blaine filled a number of very important public offices during his long residence in Geneva with credit.

John Cross, 56, for thirty years a member of the firm of Cross & Pulford, in the carriage business in Leamington, Ont., dropped dead March 3. He is survived by his wife, two daughters and four sons.

Clinton DeWitt Firestone, 66, president of the Columbus Buggy Company from its founding in 1875 until its recent reorganization, was found dead in bed in his apartments in the Hotel Vendome, Columbus, O., February 22, after retiring the night before apparently in the best of health. Death was due to apoplexy. Mr. Firestone was born at Canton, O., educated in the schools of Beaver Falls, Pa., and went through business college in Pittsburgh. For a time he was a surveyor in railroad construction work in Michigan. On moving to Columbus he first became acquainted with the firm of Peters, Benns & Co., and later with the Iron Buggy Co. and the Buckeye Buggy Co. In 1875 he was one of the organizers of the Columbus Buggy Co. and was chosen president.

Mr. Firestone was the first president of the Columbus board of trade and always stood in the forefront of those who made the city's manufacturing and commercial interests their own. He is survived by his widow, two daughters, a son, C. E. Firestone, and a half brother, Joseph D. Firestone.

The deceased was for a long time active in the affairs of the C. B. N. A. He was one of the most valuable members the executive committee has ever had, because he was a strenuous worker, always with a zeal tempered by good judgment; and his labors for the association in his official capacities of president (1888) and member of the executive committee, were up to the mark of the best endeavor, and his services were for this reason retained for many years by his associates continually reelecting him.

Henry Hett, a wagon manufacturer at 238 East 113th street, New York City, died on February 9 at his home, 2964 Decatur avenue, Bronx.

Jacob Imhof, Sr., 70, a retired blacksmith and wagon maker, died of stomach trouble February 9, at the residence of his daughter, at Doup's Point, two miles from Louisville, Ky., where he conducted his business for 23 years. He retired six years ago and turned his business over to three sons, Jacob, John and William Imhof. He had been ill a year and was confined to his bed four months.

George W. Osgood, 80, one of the best known carriage manufacturers in the east in his day, died suddenly at his home in Amesbury, Mass., February 18. He was born in Amesbury and was educated in the schools of the town, and in 1870 began manufacturing a high grade carriage of many styles that won his a reputation in all parts of the country. His wife, a son and a daughter survive.

When Amesbury was in its zenith as the seat of the better grade light vehicle industry, Mr. Osgood was one of the important builders of the town. His name naturally links with the pioneers like Jacob Huntington, and the men of that and subsequent days whose work put Amesbury on the map.

Mr. Osgood was a typical Yankee and naturally so, a very superior vehicle builder, so far as the technics of the business went and a shrewd trader. He retired before the business of the town declined.

John F. Seaman, president of the Seaman Carriage Co., Durham, N. C., was found dead in bed February 24. It is supposed that heart failure was the cause.

Charles Smyth, 75, one of the oldest leather manufacturers in Newark, N. J., died January 31, after an illness caused by paralysis. Mr. Smyth was born in Ireland and came to this country when but 15 years old. He settled in Newark and engaged in the leather business, establishing in 1862 the factory at 250 Central avenue, under the name of Charles Smyth. The firm was incorporated in 1910, under the name of Charles Smyth Co., with Mr. Smyth as president, and his sons, Frank and William, as vice-president and secretary and treasurer respectively.

About a year ago he relinquished active duties on account of blindness, which kept him confined to his home. On December 27 he suffered a stroke of paralysis, from which he did not recover.

The members of the Patent and Enameled Leather Manufacturers' Association of Newark, on February 2, at their monthly meeting, paid a fitting tribute of respect to Mr. Smyth, who was an honored member of that association. Mr. Smyth is survived by three daughters and three sons.

Harry E. Wilkey, 42, a member of the carriage manufacturing firm of A. Wilkey & Sons, Pacific street and Flatbush avenue, Brooklyn, N. Y., which was founded by his father, died March 5.

John R. Worthen, 66, died February 2 at Cambridge, Mass., where he had lived for about 35 years, during the greater part of the time having been engaged in the carriage manufacturing business, retiring a few years ago.

DEATH OF SAMUEL K. FELTON

Samuel K. Felton, president of Felton, Sibley & Co., paint and varnish manufacturers, died at his home in Olney, Philadelphia, on February 6, aged 82. Mr. Felton began his business career in 1849, when he entered the employ of C. Schrack & Co., the oldest paint house in America, remaining with them until 1863, when he formed the company of which he was so long the head. In the earlier days the firm was known as Felton, Rau & Sibley, later becoming, in 1911, Felton, Sibley & Co., Inc. For the 66 year Mr. Felton was in the paint and varnish business all of that time he was located in the same block in Fourth street, above Arch.

Mr. Felton was born in Feltonville, Philadelphia, and died within one mile of his birthplace. Three sons and two daughters survive him.

At the funeral services held in St. James' Church on Tuesday, February 10, over 1,000 persons gathered to do honor to his memory. Two Methodist bishops and over 100 clergymen were present at the services. In the main body of the church seats had been reserved for the employes of Mr. Felton's company.

INTERESTING, ALSO NEAT

Franklin Pierce has done a writing stunt for the benefit of the motor car owner in his little volume of 80 pp., entitled "Motor Car Anatomy." We acknowledge receipt of a copy from the Buckeye Mfg. Co., makers of the Lambert car at Anderson, Ind.

Mr. Pierce goes into his subject from the elementary point of view. His exposition is clear, concise and informing. It is neatly done as a printing job.

YUSTER AXLE CO. ORGANIZED AT CLEVELAND

M. L. Yuster, formerly general manager of The Hess Spring and Axle Co., Cincinnati, O., has formed the Yuster Axle Co. to manufacture automobile axles for pleasure and commercial cars. Associated with Mr. Yuster are some of the most prominent men in Cleveland.

W. R. Hopkins, of The Cleveland Short Line Railway Co. and The Cleveland Underground Rapid Transit Railroad Co., is president; E. H. Parkhurst, formerly vice-president of The Peerless Motor Car Co., first vice-president; E. W. Farr, treasurer of The Perfection Spring Co., second vice-president; Benjamin F. Hopkins, of The Belt and Terminal Realty Co., treasurer; M. L. Yuster, secretary and general manager; E. E. Muller, assistant general manager and purchasing director, and R. E. Fries, formerly with The Weston-Mott Co. and Lozier Motor Car Co., will have charge of the engineering department.

The company has acquired The Royal Tourist plant at East Seventy-second street and L. S. & M. S. Ry., which is considered one of the finest factories in the country and is so constructed that perfect daylight prevails throughout. The factory is fireproof, and has a modern sprinkling system. The latest manufacturing equipment has been installed.

DESCRIBES MAKING OF TIRES

Literature recently distributed by the advertising department of the Firestone Tire & Rubber Co. describes the manufacture of pneumatic tires and inner tubes, as well as the old solid rubber tire. A pneumatic tire casing is made up of fabric, beads, side walls, cushions, breaker strip and tread, and the importance of thorough inspection to see that each part is not only of itself perfect but that no flaws shall appear in the finished combination of the six parts, is dealt with in these instructive circulars. That inner tubes—which are subjected to great strain when inflated—should be of the highest quality of rubber and only the best of workmanship employed in their construction, and that proper tests be made to guard against leaks, air bubbles, imperfect joints, etc., is clearly explained, as well as the process by which these tubes are made. A later contribution goes into the details of the manufacture of the solid rubber tire, the gum as it comes from the calender being wrapped, layer on layer, directly on the rim on which it is to be used, the tire trimmed to the right shape when correct thickness has been reached, and then cured—after which the tread is cut by skilled workmen.

POOL AXLE PATENTS IN ONE COMPANY

The Kardo Company has been organized at Cleveland, O., as a holding company for patents owned by the Packard Motor Car Co., the Peerless Motor Car Co., and the American Ball Bearing Co. The patents are said to be far-reaching and comprehensive. The obejct of the pooling of interests was to eliminate friction due to the overlapping of the patents owned by the three corporations.

The capitalization of the company $1,500,000, and the officers are as follows: Alvan Macauley, vice-president and general manager of the Packard company, president; T. W. Frech, of the Peerless company, vice-president; F. C. Dorn, of the American Ball Bearing Co., secretary and treasurer; these men, together with Milton Tibbetts, Packard's patent counsel; F. S. Perry, of the Peerless company, and Walter C. Baker, of the American Ball Bearing Co., are the directors.

OLD VEHICLE FIRM TO CLOSE

When the E. M. Miller Carriage Co., of Quincy, Ill., shuts its doors, it will mark the passing from the world of business of one of the oldest houses in the city. It is the intention of the firm to accept no more orders for new work, and it will take a year or longer for the completion of the work now on hand.

The E. M. Miller Co. was organized in 1856 by E. M. Miller, who remained sole proprietor until 16 years ago, when E. K. Stone, the present president of the corporation, bought a half interest in the business, taking over the other half about four years ago. The reason given for the step decided at a meeting of the officers and directors of the company is the fact that instead of an increasing demand for the product there is a decrease. Accordingly, as soon as the orders now on hand are filled the firm will quit business.

A. J. Stone, the secretary and treasurer of the company, said that neither he nor his father, E. K. Stone, the president, had any plans for the future. The Miller Company is known all over the United States, and with its passing goes one of the landmarks in Quincy's business history.

MIFFLINBURG BUGGY CO. TENDERS BANQUET TO EMPLOYES AND STOCKHOLDERS

The Mifflinburg (Pa.) Buggy Co. gave its first annual banquet to its employes and stockholders on the evening of February 28. The menu consisted of a course turkey dinner.

Robert S. Gutelius, president and founder of the company, acted as toastmaster and gave a most interesting and appropriate talk on efficiency and co-operation. Harry F. Blair, vice-president, and associated with Mr. Gutelius in the business since its inception, made some well chosen remarks, and was followed by Treasurer David L. Glover, who spoke on patience and loyalty.

A number of other splendid talks and suggestions were made by different employes of the company, and a final co-operative plan was worked out, to take care of employes during illness.

GOODYEAR ADDS A THOUSAND WORKMEN

During the first week in February more than 1,000 additional workmen were employed by the Goodyear Tire & Rubber Co. at its Akron factory, increasing the force to 6,000 men and the automobile tire output to 1,000 per day. This company's factory is capable of housing 10,000 men and of turning out a yearly product of $50,000,000. Statisticians of the company figure that tires to the value of $125,000,000 should be sold in the United States this year, to equip the 1,125,000 automobiles now in operation, and this third shift of workmen has been added so that the orders falling to the company's share may be properly cared for, the factory being in constant operation day and night.

DEMONSTRATION IN TIRE REPAIRING

One of the schools of automobile instruction recently conducted a class of 26 men through the repair department of the Goodrich company's Chicago branch to witness practical demonstrations in tire repairs. These demonstrations took in every operation in the repair of a tire shoe, from cutting away of the new material and the final cure in the vulcanizer, and were supplemented by a talk by the head of the department on tire abuses, after which questions were asked and answered and a set of illustrated pamphlets on the care of tires, issued by the Goodrich company, was presented to each member of the class.

HENDERSON AGENCY FOR OHIO

Marion Long, of Newark, O., has taken the state agency for the Henderson Wagon Works and will handle their Coquillard farm and one-horse wagons in Ohio as well as their line of log wagons, lumber gears, teaming trucks, contractors' carts, ice and coal wagons, and city drays in connection with his state agency for the W. A. Paterson Co. line of carriages and buggies.

Trade News From Near and Far

BUSINESS CHANGES

J. R. Wilson has purchased the Sicka stock of vehicles, etc., in Piqua, Kas.

Mike Walz has purchased the business of Sletvold & Co., in Detroit, Minn.

E. W. James has purchased the business of N. D. Robnett, in Columbia, Mo.

L. E. Ritter has purchased the business of Frank Wallace, in Macksburg, Ia.

Goodell Bros. have been succeeded in business in Western, Neb., by E. G. Ernst.

H. H. Hofstrom has purchased the business of Williams & Doran, in Taylor, N. D.

J. R. Davis has sold out his stock of vehicles in Lanesboro, Ia., to Hubert Odendahl.

G. Lanz has sold out his stock of vehicles, etc., in Lindstrom, Minn., to A. C. Campbell.

W. A. Patton is about to engage in the vehicle and implement business in Walthill, Neb.

E. J. Lindquist has purchased the business of J. A. Hausener, in White Bear Lake, Minn.

The William Krotter Co. has purchased the business of J. H. May, in Bonesteel, S. D.

A. Heimke has purchased the stock of buggies, etc., of N. J. Dwelling, in Lansing, Minn.

A. J. Peterson has succeeded to the business of Peterson Bros., in Oconto Falls, Wis.

C. A. Summers has sold out his stock of vehicles, etc., in Byron, Neb., to Fred Peters.

Buckley Bros. have purchased the entire business of Werher & Rosencrans, in Rowley, Ia.

C. E. Bartlett has purchased the Edward Post stock of vehicles, etc., in Cameron, Wis.

Mosby & Brunson have purchased the entire business of W. S. Twist, in Bonner Springs, Kas.

The Chicago (Ill.) Coach & Carriage Co. has increased its capital from $200,000 to $1,500,000.

L. M. Jewell has disposed of his stock of vehicles in Winchester, Kas., to George W. Young.

Oscar Rude & Co. have purchased the stock of vehicles of J. A. Palchin & Son, in Chetek, Wis.

Werner & Tuttle have purchased the stock of vehicles, etc., of M. A. Race, in Stewartsville, Minn.

Kollman & Palubechi have succeeded to the business of Fishbeck & Jarvis, in Plentywood, Mont.

Charles H. Smith has succeeded to the entire business of Springer & Smith, in Independence, Kas.

Oscar Osborn has purchased the vehicle and implement business of J. B. Finney, in Ainsworth, Neb.

The Ridgell Hardware Co. has purchased the entire business of the W. L. Westbrook Co., in Beebe, Ark.

M. M. Melchert, of Ottawa, Kas., has purchased the business of W. H. Bonebrake, in Williamsburg, Kas.

Rasor & Wood have succeeded to the vehicle and implement business of James Wood, in Middleton, Mich.

C. M. Harvey has purchased the interest of M. L. Pierce in the Pierce & Harvey Buggy Co., in Afton, Okla.

H. E. Bond & Son have succeeded Bond & Johnson in the vehicle and implement business in Jamesport, Mo.

Ellington & Roberts have succeeded Richmond & Roberts in the vehicle and implement business in Lodi, Wis.

Stanley Chase in the future will conduct the wagon business, for years conducted by D. W. Bush, at Oneonto, N. Y.

Dory Laird, formerly employed as painter with the Danville (Ill.) Buggy Co., has purchased a half interest from his brother, Lou Laird, who has been in business for several years.

M. W. Thompson has purchased a half interest in the Ryan Buggy Co., at Danville, Ill., from G. W. Ryan, the former owner. The firm's name will be changed to Snyder & Thompson and the business will continue as before.

IMPROVEMENTS AND EXTENSIONS

John Johnson is erecting a new vehicle warehouse in Rockwell, Ia.

Hensley Bros., of Morris, Okla., are building an addition in which their vehicle stock will be housed.

The Troy (O.) Wagon Works which suffered heavily from the flood, has made application to increase its capital stock from $800,000 to $1,600,000.

The Consolidated Wagon & Machine Co. will erect a large business block at Brigham, Utah. The building will have a frontage of about 50 feet with about 100 feet in depth.

The Eagle Carriage Co., Cincinnati, O., has completed an addition to its plant that provides for 30 per cent. increase in the floor space and permits of practically 100 per cent. increase in manufacturing facilities.

Preparations are under way for the erection this spring of the new building to be occupied by the Hackney Buggy Co., at Wilson, N. C. These buildings will be located on the east side of the track of the Atlantic Coast Line, opposite the plant of the Hackney wagon factory.

The Florida Hickory Wagon Works, recently destroyed by fire in Tallahassee, has rebuilt and will shortly be manufacturing again. The new plant of the company consists of a concrete building equipped with modern machinery. It is conveniently located and is a substantial factor in the business life of the capital city.

Owens Bros. recently moved into their new concrete building at Lima, O. The building is 70 x 120 feet and consists of three floors and basement. The basement is given over to the heating and power plant, storage of raw material, etc. On the first floor are located the offices, salesroom, blacksmith shop, wood shop and body builders, and trimming department. The second floor is given over to storage and the setting-up department. On this floor provision is made for storage of automobiles during the winter months. The storage rooms are well lighted, and kept heated at a uniform temperature day and night. The third floor is given up entirely to the painting department. All floors are connected by a mammoth elevator, with a platform 8 x 20 feet, run by electricity.

NEW FIRMS AND INCORPORATIONS

M. M. McElhany is opening a new stock of buggies, etc., in Nelson, Neb.

E. Rodman is putting in a new stock of vehicles, etc., in Tamora, Neb.

B. O. Cuddigan is about to open a new stock of vehicles, etc., in Wadena, Minn.

C. Thoreson has disposed of his business in Mohall, N. D., to J. P. Brennan & Co.

Kay & Bichel have engaged in the vehicle and implement business in Wayne, Neb.

H. J. Norris is about to engage in the vehicle and implement business in Kinsley, Kas.

Cole & Welms have engaged in the vehicle and implement business in Roseland, Neb.

Boe & Jacobson have engaged in the vehicle and implement business in Williston, N. D.

Hugo Seek, of Keystone, Ia., is about to engage in the vehicle business in Bryant, S. D.

The Brown Carriage Co. is about to establish a manufacturing plant in Elizabethton, Tenn.

The G. O. Raines Co. has engaged in the vehicle and implement business in Beatrice, Neb.

W. W. Beaty, of Linn, Kas., has engaged in the vehicle and implement business in Glasco, Kas.

Henry & Wassenberger have engaged in the vehicle and implement business at Harrison, Neb.

E. T. Phelps has disposed of his stock of vehicles, etc., in Eckelson, N. D., to Anton Fried & Son.

Watts & Rogers have purchased the business of the Proebstel Hardware & Implement Co., in Weston, Ore.

The Hill Buggy & Wagon Co., Lynchburg, Va., has been incorporated with a capital of $50,000, to manufacture vehicles.

The Ahrenbeck Vehicle Co. has been incorporated at Navasota, Tex., with a capital of $20,000, by E. L. Ahrenbeck, S. F. Miller, W. F. Ahrenbeck.

The Sanitary Wagon Co. has been incorporated at Wilmington, Del., capital $150,000, to manufacture wagons, carts, etc., by C. B. Bishop, C. J. Jacobs and H. W. Davis.

The Conant Carriage Woodwork Co. has been incorporated at Cincinnati, O., with a capital of $20,000, to manufacture buggy supplies, by M. M. Conant, Gilbert Bettman, Jos. Keadin, M. Mitchell and John Ellis.

The Berkeley Buggy Co. has been organized at Martinsburg, W. Va., for the purpose of doing a general business in vehicles, farm implements and harness. The company has a capital stock of $25,000. The officers are as follows: President and treasurer, D. W. Shaffer; vice-president, Ray Barney; secretary, Paul H. Martin; board of directors, the above, James Barney and P. R. Harrison.

FIRES

The Priebe-Matthews Carriage Co. sustained a loss by fire on February 12 estimated at $30,000.

James H. Maher, carriage manufacturer and harness maker, Boston, Mass., suffered a fire loss March 3.

The plant of the Pacific Wagon & Carriage Works, at Seattle, Wash., was destroyed by fire on February 20.

The wagon shop of J. J. Wier, at Pittsburgh, Pa., suffered a loss by fire estimated at $2,500, on March 2.

The coach and wagon works of Martin Baldwin, at New Providence, Pa., was badly damaged by fire on February 13.

Damage to the extent of $300 was sustained by E. H. Kellen carriage manufacturer at Fort Worth, Tex., on February 23.

Blanchard Bros. & Lane, large Newark, N. J., tanners, suffered a slight damage in a recent fire which occurred in the japan shop of the plant.

John B. Browdue's carriage factory at Martinsville, Ind., sustained a $3,500 fire loss on February 19. The machinery in the blacksmith shop was ruined.

Fire in the boiler room of the Lenhart Wagon Co. plant at Minneapolis, Minn., February 23, caused $4,500 damage and temporarily suspended operation of the plant.

VEHICLE TRADE INCREASES

St. Louis has the biggest buggy business and the largest vehicle factories in the United States. The annual implement and vehicle business of St. Louis is steadily increasing.

But what of the automobile? Isn't it driving the buggy out of business?

In the state of Missouri alone there are 277,000 farms. In the state of Missouri there are 39,000 automobiles. In St. Louis there are 9,000 automobiles. In Kansas City there are 6,000, and in St. Joseph, 2,500. That leaves the remainder for the other cities and farms. In other words, the farmers must have something like 260,000 buggies in order that each farm may be supplied with one vehicle.

The same condition exists in Illinois and in other farming states surrounding St. Louis. Automobiles are becoming more popular every day. St. Louis is a great user of automobiles. If one has an idea that St. Louis is not an automobile city, all he has to do is to stand in front of Christ Church Cathedral any day and count the machines hurrying along Locust street.

At the same time Missouri is a great buggy state. Missouri is using more buggies today than it used yesterday. It uses more this year than it did last year. The automobile and buggy are not competitors. They are used entirely by different persons. There is no doubt but that the automobile has displaced the hack in many places, but it has not displaced the horse vehicle generally.

In St. Louis more than $7,000,000 worth of vehicles were manufactured last year.

From a manufacturer of vehicles and a seller of implements for the Missouri trade alone St. Louis has advanced to a manufacturer of vehicles for all parts of the world. Vehicles are exported to South Africa in great numbers. We ship vehicles and implements out by train in the largest numbers of course, but the river, too, is used for that purpose. One of the big buggy plants is located on the river front and from that point vehicles are exported by boat to New Orleans and loaded on ships. Vehicles from St. Louis also are billed by way of New York for South African points.

The vehicle houess here have their own timber lands in Arkansas, where they cut their own hickory. Last year St. Louis gained $1,000,000 business in the manufacture of buggies alone. That does not sound as though the automobile is encroaching on the buggy territory out of St. Louis. Of course the implement business is as old as farming and will last as long as we have farm products for our tables.

Styles of vehicles change with new inventions and with greater perfection in manufacture. None but perfect machines are turned out because of the rigid inspection process. Every piece of machinery is inspected after each manufacturing process. A wheel for a farm wagon goes through a dozen inspections before it is ready to be passed as a good wheel. It is inspected when each part is manufactured. It is inspected when the parts are assembled, and is again inspected before it is given over to the final manufacturer to be placed on a wagon.—Farm Machinery.

ANOTHER NEW BUILDING FOR FIRESTONE

A permit has been issued by the building department for the erection of another building by the Firestone Tire & Rubber Co., at Akron, O. The new structure is to be 44 x 60 feet, of fireproof concrete and steel, and when completed will be equipped with apparatus for purifying and softening the water used by the company, before it goes into the boilers. It is to be situated near the railroad, in the rear of the present main buildings, and the cost is estimated at about $5,000.

LEWIS AXLE MAN FORMS TRUCK COMPANY

Headed by Murray Irwin, sales manager of the Lewis Spring & Axle Co., Jackson, Mich., the Irwin Motor Truck Co. has been incorporated with $500,000 capital, to manufacture the Irwin truck; the factory is to be located in Marshall, Mich., but the type of the vehicle has not been made public. The Lewis company has no interest in the Irwin company.

Dunlop wire wheels are now being manufactured in quantities in the factory recently opened for this purpose at Long Island City, N. Y.

OPERATION FOR PARALYSIS

Will Gilbert, formerly engaged in carriage building in Atchison, Kas., recently underwent an operation in an attempt to regain the use of his lower limbs, which seem to be affected with paralysis. The nerves of his back were operated on and he is now able to get around with some assistance. Mr. Gilbert resides at Memphis, Tenn. The operation was performed in Atchison.

OFFICIALS VISIT STOUGHTON PLANT

General Superintendent J. L. Irving, of the Moline Plow Co.; W. H. Masten and H. H. Hansen, of the trade department, and Auditor J. C. VanDoren, of the Moline concern, were in Stoughtin, Wis., recently for a brief business visit at the Mandt Wagon Works. Mr. VanDoren, who stayed over, is looking after the installation of a uniform system of bookkeeping in the various branch plants of the Moline Plow Co.

REDUCED WAGON RATES

It is reported that the Wisconsin Railroad Commission has issued an order requiring the railroads of that state to apply second class rates to shipment of farm wagons, farm trucks, logging trucks and gasoline engine trucks; also to wagon boxes These lines have been taking first class rates.

GILLETTE ROLLER BEARINGS CHANGE HANDS

Herbert G. Gillette and the R. G. Peters Co., of Grand Rapids, Mich., have disposed of their rights in the Gillette automobile tapered roller bearings to eastern men who have organized the Gillette Roller Bearing Co. The latter has been incorporated under the laws of Delaware with an authorized capital of $350,000, of which $250,000 is represented by common stock.

SOLID TIRE CAMPAIGN

The Firestone Tire & Rubber Co. is conducting a campaign among the horsed vehicle builders and dealers on the solid rubber tire proposition. It is designed to find out a lot of things about requirements, specifications, etc., and we have no doubt the Firestone forces are lining up for an onslaught that shall be active and result compelling.

THE LINCOLN HIGHWAY

The need for funds to push the work on the Lincoln highway is now pressing. The road across Iowa is nearly completed, and its payment is guaranteed. Much more remains to be done. Send funds to Lincoln Highway Association, Detroit.

WANTS

Help and situation wanted advertisements, 1 cent a word; all other advertisements in this department, 5 cents a word; initials and figures count as words. Minimum price, 30 cents for each advertisement.

PATENTS

Patents—H. W. T. Jenner, patent attorney and mechanical expert, 606 F St., Washington, D. C. Established 1883. I make a free examination and report if a patent can be had and exactly what it will cost. Send for circular.

HELP WANTED

Manager—For vehicle woodstock and heavy hardware jobbing concern for New York City and vicinity. Must be capable and energetic, and thoroughly acquainted with the trade and requirements in that territory. An opportunity will be offered to acquire an interest in the company. Address "Jobbing," care The Hub, 24 Murray street, New York City.

NEW PICKLING PROCESS

A new process for pickling iron parts has been introduced by the Mesta Machine Co. This method of removing the scale is very thorough and rapid, and the work is done, it is asserted, in half the time and with half the labor.

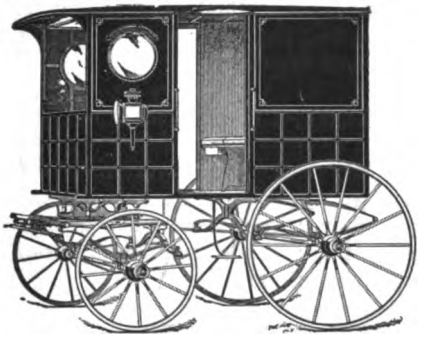
WILL BE A SUBSCRIPTION PROPOSITION

If plans carry, after July 1 the important and interesting "Daily Consular and Trade Reports" will become a subscription publication, at $2.50 per year, through the Government Printing Office. Trade journals and other useful publications will receive it as an exchange proposition.

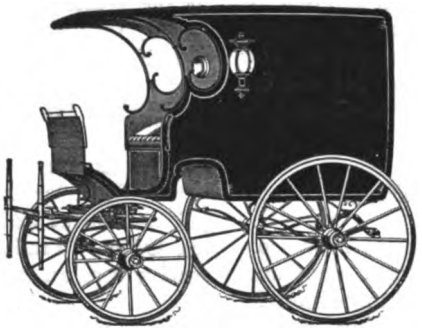
N. G. SIX CYLINDERS

This is not a six-cylinder year so far as Continental makers are concerned. There will probably be fewer sixes than last year, certainly the number will not show an increase. The eight-cylinder motor introduced more than a year ago by one well known firm has not had imitators, although the advisability of building eights has been well discussed in technical circles.

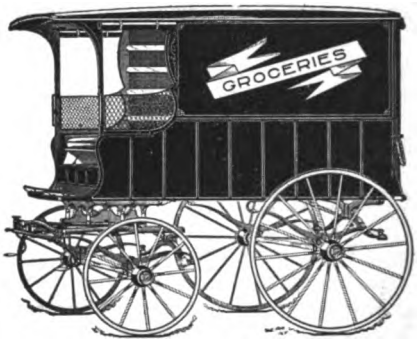
INDEX TO ADVERTISERS



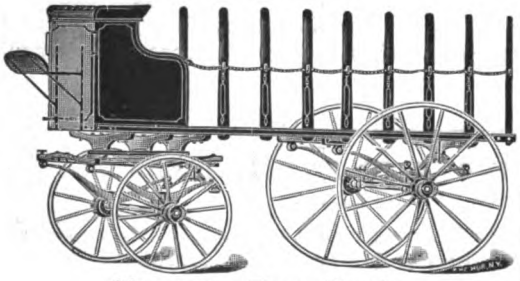
No. 112.—Milk Wagon.



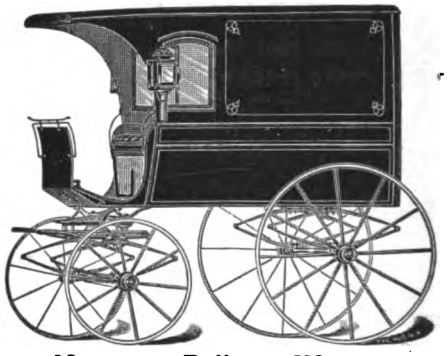
No. 111.—Altman Wagon.



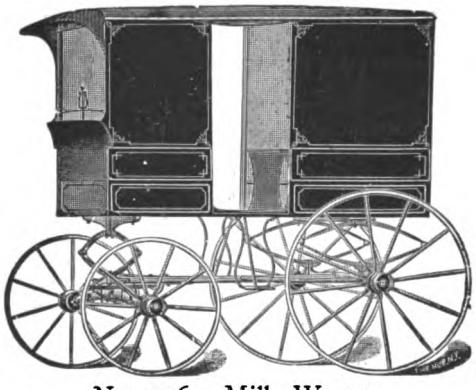
No. 113.—Grocery Wagon.



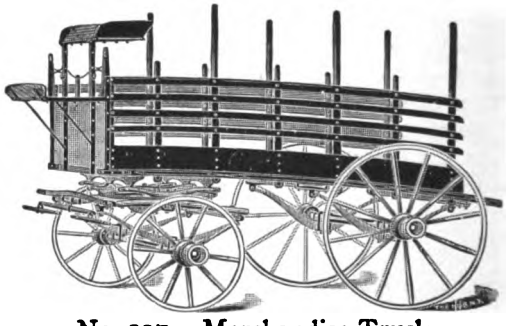
No. 122.—Flour Truck.



No. 115.—Delivery Wagon.

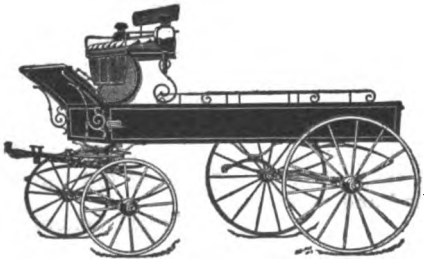


No. 116.—Milk Wagon.

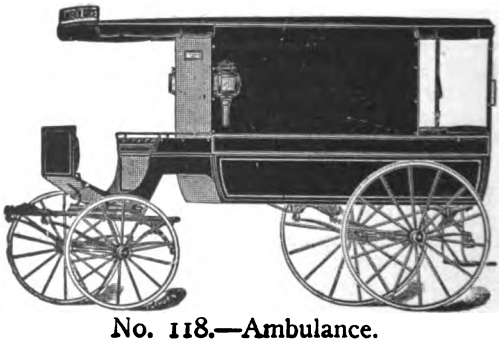


No. 117.—Merchandise Truck.

No. 114.—Delivery Wagon.

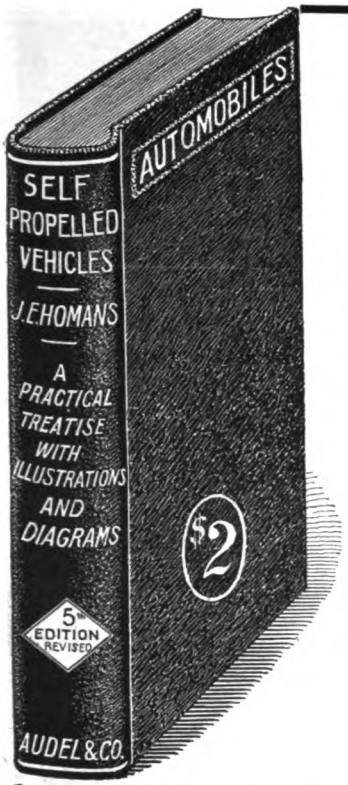


No. 124.—Delivery Wagon.



No. 118.—Ambulance.

BUSY BUYERS BRIEFS



"Self-Propelled Vehicles"

Fifth Edition, Revised.

A practical treatise on the theory, construction, operation, care and management of all kinds of Automobiles.

By

JAMES E. HOMANS, A.M.

Contains 608 pages and upwards of 500 illustrations and diagrams, giving the essential details of construction and many important points on the successful operation of the various types of motor carriages driven by steam, gasoline and electricity.

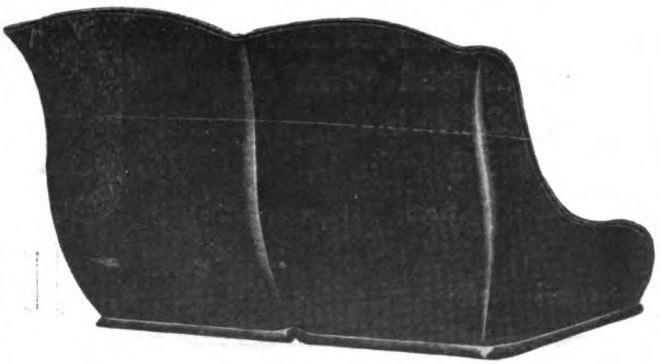
This work is now the accepted standard, explaining the principles of construction and operation in a clear and helpful way. This book will be sent postpaid to any address in the United States, Mexico or Canada upon receipt of $2.00.

Address

Trade News Publishing Co.

24 Murray Street, New York

Lawson's Sunken Panel, Twin Metal Buggy Seats



The Strongest—Neatest on the Market

Made in six sizes and of either 22 or 20 gauge automobile sheet metal. The Lawson seats are edged and bumped together by heavy presses.

We Use No Solder

Our seats were never known to come apart or rumble.

Write for Prices

The F. H. Lawson Co.

(Established 1816)

Cincinnati - - - Ohio

1855—Standard for 59 Years—1914

Jones Wheels

"Best on Earth"

The Name of Jones as Applied to Wheels Means the

First, Last and All-the-Time Word in Wheels

"Kantsamore"

Buyers of vehicles should say, "Give me wheels made by

Phineas Jones & Co.

NEWARK NEW JERSEY U. S. A.

LET'S TALK ABOUT WELTS, GIMPS and BINDINGS

AND A FEW OTHER
GOOD THINGS WE HAVE
SUCH AS SHAFT AND AUTO STRAPS
PROP BLOCKS (Wire Wrapped)
CUT LEATHER (All Grades)
RIGHT PRICES

BACKSTAY MACHINE AND LEATHER CO.

UNION CITY IND.

The WEST Hydraulic Tire Setter

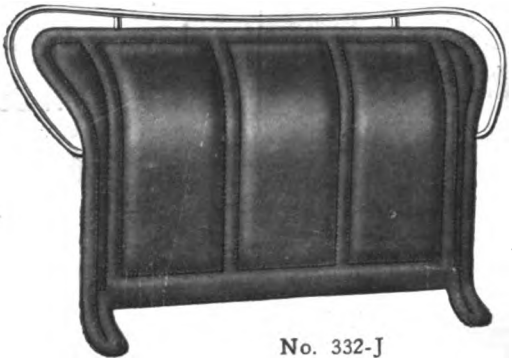
WILL CUT DOWN EXPENSE

Tires set cold in one minute. This machine saves time—does the work better and quicker, does away with burned streaks. Only necessary to measure one wheel in a lot. Does not char the rim, and thus make the tire loosen prematurely. Saves resandpapering of wheels. This machine is now increasing the profits of many manufacturers. Send for catalog and read about it.

WEST TIRE SETTER CO., ROCHESTER, NEW YORK

TROY, OHIO
CINCINNATI, OHIO

Your Vehicles will sell against the sharpest competition if furnished with McKINNON WING DASHES



No. 332-J

ST. CATHARINES, ONTARIO

A WING DASH with Japanned Rail that has a style and finish to suit the finest vehicle

McKINNON DASH CO. BUFFALO, N. Y.

"BLACK VELVET" CUSHION SPRINGS

Manufactured Only by the

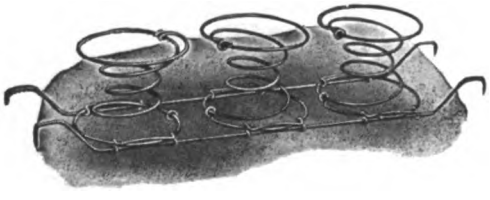
NATIONAL SPRING AND WIRE COMPANY

ALBION, MICH. WINDSOR, ONT.

THE SPRING OF QUALITY.

SPRING or SOFT EDGE CUSHION FRAME

For Buggies or Other Vehicles. Built of the Highest Grade of Steel Wire.



STRIP FOR WOOD OR BOX FRAME

WILLEY'S COLORS

The RECOGNIZED STANDARD

C. A. WILLEY CO.

COLOR GRINDERS

and Manufacturers of Specialties in

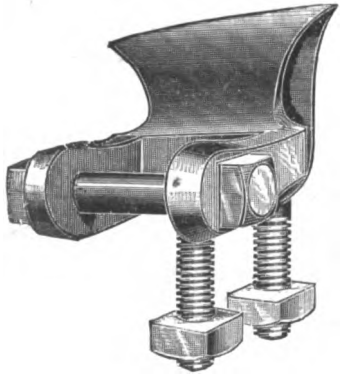
CARRIAGE, AUTOMOBILE AND CAR

PAINTS

COLORS, VARNISHES, ETC.

HUNTER'S POINT, NEW YORK CITY

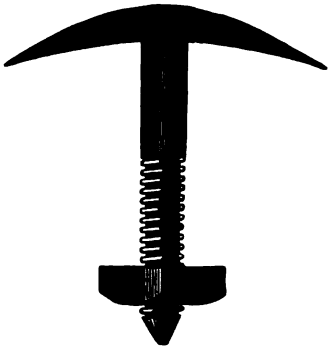
Skewed Shaft Couplings



Regular or Oval Patterns For High Arched Axles

Furnished in rights and lefts for any height of arch. Oval Axle Clips ⅝ or ¾ width to match Oval Couplings. Bolts, Clips, Couplings, Carriage Hardware and Special Forgings

Catalogue "H" and Prices on Application



COLUMBUS BOLT WORKS, Columbus, O.